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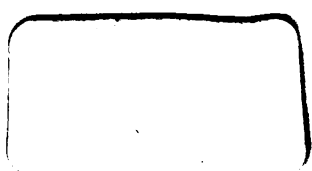
*Journal of the American
Geographical Society of New York*

American Geographical Society of New York



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1861.

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NEW YORK.

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1975

AMERICAN GEOGRAPHICAL SOCIETY.

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1889.

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CHARTER OF INCORPORATION.

GRANTED APRIL 13, 1854.

The People of the State of New York, represented in Senate and Assembly, do enact as follows :

SECTION 1. George Bancroft, Henry Grinnell, Francis L. Hawks, John C. Zimmerman, Archibald Russell, Joshua Leavitt, William C. H. Waddell, Ridley Watts, S. De Witt Bloodgood, M. Dudley Bean, Hiram Barney, Alexander J. Cotheal, Luther B. Wyman, John Jay, J. Calvin Smith, Henry V. Poor, Cambridge Livingston, Edmund Blunt, Alexander W. Bradford, and their associates, who are now or may become hereafter associated for the purposes of this act, are hereby constituted a body corporate by the name of "The American Geographical and Statistical Society," for the purpose of collecting and diffusing geographical and statistical information.

§ 2. For the purposes aforesaid, the said Society shall possess the general powers and privileges, and be subject to the general liabilities, contained in the third title of the eighteenth chapter of the first part of the Revised Statutes, so far as the same may be applicable, and may not have been modified or repealed ; but the real and personal estate which the said Society shall be authorized to take, hold, and convey, over and above its library, and maps, charts, instruments, and collections, shall not at any time exceed an amount the clear yearly income of which shall be ten thousand dollars.

§ 3. The officers of said Society shall be a president, three vice-presidents, a corresponding secretary, a recording secretary, a librarian, and a treasurer and such other officers as may from time to time be provided for by the by-laws of the said Society.

§ 4. The said Society, for fixing the terms of admission of its members, for the government of the same, for changing and altering

the officers above named, and for the general regulation and management of its transactions and affairs, shall have power to form a code of by-laws, not inconsistent with the laws of this State, or of the United States, which code, when formed and adopted at a regular meeting, shall, until modified or rescinded, be equally binding as this act upon the said Society, its officers, and its members.

5. The Legislature may, at any time, alter or repeal this act.
6. This act to take effect immediately.

STATE OF NEW YORK, } ss.:
Secretary's Office,

I have compared the preceding with the original law on file in this office, and hereby certify the same to be a correct transcript therefrom, and of the whole of said original law.

Given under my hand and seal of office, at the city of Albany, this
[L. s.] thirteenth day of April, one thousand eight hundred and fifty-four.

A. G. JOHNSON,
Deputy Secretary of State.

AMENDED CHARTER.

PASSED APRIL 8, 1871.

STATE OF NEW YORK, NO. 237, IN SENATE. *March 7, 1871.*—
Introduced with unanimous consent, by Mr. Bradley; read twice,
and referred to the Committee on Literature; reported favorably
from said committee, and committed to the Committee of the
Whole.

CHAP. 373.

AN ACT in relation to The American Geographical and Statistical
Society.

PASSED April 8, 1871.

*The People of the State of New York, represented in Senate and
Assembly, do enact as follows :*

SECTION 1. The name or corporate title of the said Society shall
hereafter be The American Geographical Society of New York.

§ 2. The object of the said Society shall be the advancement of
geographical science; the collection, classification and scientific
arrangement of statistics, and their results; the encouragement of
explorations for the more thorough knowledge of all parts of the
North American continent, and of other parts of the world which
may be imperfectly known; the collection and diffusion of geo-
graphical, statistical and scientific knowledge, by lectures, printed
publications, or other means; the keeping up of a correspondence
with scientific and learned societies in every part of the world, for
the collection and diffusion of information, and the interchange of
books, charts, maps, public reports, documents, and valuable publica-

tions ; the permanent establishment in the city of New York of an institution in which shall be collected, classified, and arranged, geographical and scientific works, voyages, and travels, maps, charts, globes, instruments, documents, manuscripts, prints, engravings, or whatever else may be useful or necessary for supplying full, accurate, and reliable information in respect to every part of the globe, or explanatory of its geography, physical and descriptive ; and its geological history, giving its climatology, its productions, animal, vegetable, and mineral ; its exploration, navigation, and commerce ; having especial reference to that kind of information which should be collected, preserved, and be at all times accessible for public uses in a great maritime and commercial city.

§ 3. The power given by the act hereby accorded to the said Society, to take, hold, convey, manage, and make use of its real and personal estate, shall be understood as authorizing said Society to take and hold by gift, grant, bequest, devise, subject to all provisions of law relative to devises and bequests by last will and testament, or purchase real estate to the value of three hundred thousand dollars, and to invest its income, or its personal estate generally, so as to produce a regular annual income sufficient for the accomplishment of the purposes set forth in the first section of this act ; but said annual income shall not exceed twenty-five thousand dollars annually.

§ 4. The said Society shall make an annual report of its proceedings to the Legislature.

STATE OF NEW YORK, }
Office of Secretary of State, } ss. :

I have compared the preceding with the original law on file in this office, and do hereby certify that the same is a correct transcript therefrom, and of the whole of said original law.

{L. S.] Given under my hand and seal of office, at the city of Albany, this twenty-second day of May, in the year one thousand eight hundred and seventy-one.

DIEDRICH WILERS, JR.,
Deputy Secretary of State.

BY-LAWS.

CHAPTER I.

TITLE.

The title of the Society is, "The American Geographical Society."

CHAPTER II.

OBJECTS.

The objects of the Society are, "The collecting and diffusing of geographical and statistical information."

CHAPTER III.

MEMBERS.

1. The Society shall consist of Fellows, Honorary, Corresponding, and *ex-officio* members.
2. Honorary members shall be chosen on account of their distinction in the science of geography or statistics, and not more than twelve of them shall hereafter be elected in any one year.
3. Corresponding members shall be chosen from those who have aided the advancement of geography or statistics.
4. *Ex-officio* members shall be foreign diplomatic representatives and consuls resident in the United States ; and United States diplomatic representatives and consuls in foreign countries.
5. Fellows and Corresponding and Honorary members shall be elected as follows : All nominations of candidates shall be openly made in writing at a meeting of the Society, or the Council, by a member thereof, and, together with the name of the member making them, entered on the minutes. The persons thus nominated, when

approved by the Council and elected by the Society, shall, on payment of the initiation fee, if nominated as Fellows, and without such payment if nominated as Corresponding or Honorary members, become members of the Society accordingly.

6. Persons entitled to become *ex-officio* members of the Society shall, on the recommendation of the Council, be, by the Society, constituted and declared to be such members.

7. The name of any member of the Society may, on the recommendation of the Council, and by a vote of two thirds of the members present at a stated meeting of the Society, be dropped from the roll of its members.

CHAPTER IV.

INITIATION FEE AND ANNUAL DUES.

1. The initiation fee, including the dues for the current year, shall be, for a Fellow, ten dollars, to be paid immediately on election.

2. The annual dues thereafter shall be, for a Fellow, ten dollars, to be paid in advance.

3. Any Fellow of the Society, not in arrears, may commute for life all dues for fellowship by the payment at one time, if a Fellow, of one hundred dollars.

4. The name of any Fellow of the Society neglecting for two successive years to pay his annual dues, or at any time wholly refusing to pay them, may by the Council be erased from the list of Fellows of the Society.

5. The fiscal year of the Society shall, for all purposes, be the calendar year—that is, commence on the first day of January, and end with the 31st day of December in each year.

CHAPTER V.

OFFICERS.

1. The officers of the Society shall be a president, three vice-presidents, a foreign corresponding secretary, a domestic corresponding secretary, a recording secretary, a treasurer, and fifteen councillors; and these, together, shall form the Council of the Society.

2. The officers and members of Council elected at the next

annual election (except the president and treasurer) shall, at their first meeting, divide themselves into three classes, each to embrace one vice-president, one secretary, and five members of the Council ; one of which classes shall hold office one year, one for two years, and another for three years, to be determined at said meeting by lot or otherwise. The president and treasurer shall always be elected annually ; and at each annual election thereafter there shall be elected a vice-president, a secretary, and five members of Council, each for the term of three years.

3. All officers of the Society to be chosen at any election may be voted for on one ballot.

CHAPTER VI.

ANNUAL MEETING.

1. The annual meeting of the Society shall be held on the second Tuesday after the first day of January in each and every year hereafter, when the annual election of the officers of the Society shall take place ; and if, from any cause, there shall be a failure of the annual election at the time above designated for that purpose, the same may be held on the Tuesday next following—that is, on the third Tuesday after the first day of January in each year—and of which due notice shall be given.

2. Every member of the Society, who has been such for twenty days or more, and who is not in arrears for his dues for the past year, shall be entitled to vote at the said election.

3. At the annual meeting of the Society the Council shall present a general report of its proceedings and of those of the Society during the past year, and the secretaries and the treasurer shall also present their annual reports.

CHAPTER VII.

MONTHLY AND SPECIAL MEETINGS.

1. The Society, unless otherwise specially ordered by the Society or the Council, shall hold its stated meetings for the transaction of business on the second Tuesday of each month of the year, except July, August, and September.

2. The president, or, in his absence, one of the vice-presidents, may, and upon the written request of five members, shall, call a

special meeting of the Society by giving three days' notice thereof in two daily newspapers published in the city of New York.

CHAPTER VIII.

ORDER OF BUSINESS.

1. At all stated meetings of the Society for the transaction of ordinary business the order of proceedings shall be as follows :

1. Reading of the Minutes.
 2. Reports and Communications from Officers of the Society.
 3. Reports from the Council.
 4. Reports from Committees.
 5. Nominations of Members.
 6. Special Orders.
 7. Unfinished Business.
 8. Miscellaneous Business.
 9. Papers Read and Addresses Delivered before the Society.
2. All propositions presented for the action of the Society at any of its meetings shall be in writing, when requested by the presiding officer or any member. A proposition thus presented, when seconded and the question thereon stated from the chair, shall be deemed to be in the possession of the Society and open for discussion, but may be withdrawn by the mover at any time before amendment or decision.
3. No member shall speak more than once upon the same question until all the other members present desiring to speak shall have spoken, nor more than twice on any question without leave of the Society.

CHAPTER IX.

QUORUM.

At all meetings of the Society nine members present shall constitute a quorum for the transaction of business.

CHAPTER X.

COMMITTEES.

All committees authorized by the Society shall, unless otherwise specially ordered, consist of three members each, and be appointed by the presiding officer.

CHAPTER XI.

PRESIDING OFFICER.

At all meetings of the Society, on the arrival of the appointed hour and the presence of a quorum, the president, or in his absence one of the vice-presidents, or in the absence of both a chairman *pro tem.*, shall immediately take the chair, call the meeting to order, and preside. He shall have only a casting vote. He shall preserve order and decide all questions of order, subject to an appeal to the Society. He shall also, unless otherwise specially ordered, appoint all committees authorized by the Society ; and at every annual election, Before the opening of the polls, he shall appoint two tellers of the election.

CHAPTER XII.

SECRETARIES.

1. Foreign Corresponding Secretary.—It shall be the duty of the foreign corresponding secretary to conduct the general correspondence of the Society with individuals and associate bodies in foreign countries.

2. Domestic Corresponding Secretary.—It shall be the duty of the domestic corresponding secretary to conduct the Society's general correspondence with individuals and associate bodies in the United States.

3. Both the foreign and domestic secretaries shall keep in suitable books to be provided for that purpose, at the Society's rooms, true copies of all letters written by them respectively on behalf of the Society ; and shall preserve, on proper files, at the said rooms, all letters received by them on the same account ; and at each stated meeting of the Society or the Council, they shall respectively report their correspondence, and read the same, or such parts thereof as may be required.

4. In case of vacancy in the office of either of the corresponding secretaries, or in the absence or disability of either of these officers, the duties of both may be performed by the other corresponding secretary.

5. The Society may designate a particular officer, or appoint a committee to prepare a letter or letters on any special occasion.

6. Recording Secretary.—It shall be the duty of the recording

secretary to give due notice of the time and place of all meetings of the Society, and to attend the same. He shall keep fair and accurate minutes of the proceedings of the Society, and record the same, when approved, in the Society's Journal. He shall give immediate notice to the several officers and committees of the Society, of all votes, orders, resolves, and proceedings of the Society affecting them or appertaining to their respective duties. He shall prepare a list of the members of the Society entitled to vote, to be handed to the tellers before the opening of the polls at each annual election. He shall officially sign and affix the corporate seal of the Society to all diplomas and other instruments or documents authorized by the Society or Council. He shall have charge of the corporate seal, charter, by-laws, records, and general archives of the Society, except so far as they may be expressly placed under the charge of others. He shall certify all acts and proceedings of the Society, and shall notify the Council of the death, resignation, or removal of any officer or member of the Society. He shall have charge of the rooms of the Society, and shall perform all such other and further duties as may from time to time be devolved upon him by the Society or the Council. He, together with the Council, shall have the charge and arrangement of the books, maps, and collections belonging to the Society. He shall cause to be kept in the rooms of the Society a registry of all donations to the library or collections of the Society, acknowledge their receipt by letter to the donors, and report the same in writing to the Society at its next stated meeting.

7. All documents relating to the Society and under the charge of the secretaries respectively, shall be placed in such depositories in the rooms of the Society as the Council may provide and designate for that purpose.

CHAPTER XIII.

TREASURER.

The Treasurer shall have charge of and safely keep all contracts, certificates of stock, securities, and muniments of title belonging to the Society. He shall collect the dues and keep the funds of the Society, and disburse the same under the direction of the Council; and so often as the said funds in the hands of the treasurer shall amount to one hundred dollars, he shall deposit the same, in the

name of the Society, in some incorporated bank in the city of New York, to be designated for that purpose by the Council ; and the said funds, thus deposited, shall be drawn out of the said bank on the check of the treasurer, countersigned by the chairman of the Council, and only for the legitimate and authorized purposes of the Society. The treasurer shall, previous to the annual meeting of the Society, prepare and submit to the Council for audit, a detailed account of his receipts and disbursements for account of the Society during the past year ; and which annual account, duly audited, he shall present, with his general report, to the Society at its annual meeting.

CHAPTER XIV.

COUNCIL.

1. The Council shall have the management and control of the affairs, property, and funds of the Society, and shall designate an incorporated bank in the city of New York, where the said funds shall, from time to time as they accrue, be deposited by the treasurer.

2. It may frame its own by-laws, not inconsistent with the charter or by-laws of the Society.

3. It shall appoint the necessary agents, clerks, and servants of the Society, with such powers and duties, privileges and compensation as it may from time to time determine ; and may at pleasure revoke such appointments, and make others in their stead.

4. It shall have power to fill, for the unexpired term, any vacancy that may occur in any of the offices of the Society.

5. It shall have power, at its discretion, to declare vacant the seat of any member of its own body (except the president and vice-presidents) who shall have been absent from its meetings for three successive months ; and also by a vote of a majority of the whole Council to remove from its own body any member thereof for cause ; but in such case it shall be the duty of the Council to report every such vacancy or removal to the Society, at its next stated meeting thereafter, when such cases shall be subject to review by the Society.

6. It shall not, without an approving vote of the Society at a stated meeting thereof, make any contract whereby a liability in amount above one thousand dollars may be incurred by the Society · nor

without such vote make any sale or disposition of the property of the Society exceeding that sum in value.

7. The Council may, in its discretion, remit the initiation fee or annual dues of any member of the Society.

8. No member of the Council shall receive any salary or pecuniary compensation for his services.

9. The Council shall hold stated meetings for the transaction of business at least once in every month, except the months of July, August, and September.

10. At all meetings of the Council, five members present shall constitute a quorum for the transaction of business.

CHAPTER XV.

GENERAL PROVISION AS TO DEBT.

No debt on account of the Society, beyond the funds in the treasury for its payment, shall for any purpose, at any time, be incurred; and if at any time it shall appear that there are resting upon the Society pecuniary obligations beyond the funds in the treasury for their liquidation, no appropriation of funds from the treasury whatever, except for the necessary current expenses of the Society, shall be made, until the said pecuniary obligation shall be fully discharged, or the funds necessary for their extinction shall have been set apart for that purpose.

CHAPTER XVI.

ALTERATION OF THE BY-LAWS.

No alteration in the by-laws of the Society shall be made unless openly proposed at a stated meeting of the Society, entered on the minutes, with the name of the member proposing the same, and adopted by the Society at a subsequent meeting, by a vote of two thirds of the members present.

CHAPTER XVII.

ADOPTION OF THE BY-LAWS.

The foregoing are hereby adopted and declared to be the by-laws of the Society; and all by-laws of the Society heretofore adopted are hereby rescinded and declared to be null and void.

HONORARY AND CORRESPONDING MEMBERS AND FELLOWS.

HONORARY MEMBERS.

BAKER, Sir Samuel W., F.R.S., F.R.G.S.	retary of the Royal Geographical Society.
CONSTANTINE, the Grand Duke, President of the Imperial Russian Geographical Society, St. Petersburg.	McCLINTOCK, Admiral Sir F.L., R.N.
DUFFERIN and AVA, the Marquis of.	NARES, Rear-Admiral Sir George S., R.N., K.C.B.
ELDER, Sir Thomas, Adelaide, South Australia.	NORDENSKIÖLD, Baron A. E., Stockholm.
ISMAIL, ex-Khedive of Egypt.	PEDRO II., ex-Emperor of Brazil.
LAYARD, Sir Austen Henry, D.C.L.	RAWLINSON, Major-General Sir Henry C., K.C.B., Vice-President of the Royal Geographical Society.
MARKHAM, Clements R., K.C.B., Sec-	

CORRESPONDING MEMBERS.

ABBE, Prof. Cleveland, Washington.	MAUNOIR, Charles, Paris.
AMMEN, Rear-Admiral Daniel, U.S.N., Washington.	MAURY, Louis Ferdinand Alfred, Paris.
BARTHOLOMEW, John, Edinburgh.	McCARTEE, D. Bethune, M.D., New York.
BREWER, Prof. Wm. H., New Haven.	NEGRI, Cristoforo, Turin.
BROWNLEE, HARRISON J., C.E., Manitoba.	NEY, Count Napoléon, Paris.
BALLANTINE, Henry, Bombay.	PACKARD, Prof. A. S., Providence, R. I.
BONAPARTE, Prince Roland, Paris.	PERALTA, Manuel M. de, Liege.
CHAIX, Prof. Paul, Geneva, Switzerland.	PRINCE, Hon. L. Bradford, Santa Fé, N. M.
CHAIX, Prof. Emile, Geneva, Switzerland.	PUMPELLY, Prof. Raphael.
DAVIDSON, Prof. Geo., U. S. Coast and Geodetic Survey, San Francisco.	RAE, John, M.D., London.
GARDNER, Prof. James T., Albany.	RAIMONDI, Antonio, Lima, Peru.
GILLIODTS VAN SEVEREN, L., LL.D., Bruges.	ROMERO, Matias, Envoy of Mexico at Washington.
GILMAN, Daniel C., LL.D., President Johns Hopkins University, Baltimore.	SCHUYLER, Hon. Eugene.
LESSEPS, Ferdinand de, Paris.	STANLEY, Henry M.
LONG, Col. C. Chaillé.	TACHÉ, E. E., Asst. Commissioner of Crown Lands, Quebec.
LUCE, Admiral S. B., U.S.N.	VINCENT, Frank, Jr.
LUMHOLTZ, Carl, M. A., Christiania, Norway.	VIVIEN DE SAINT-MARTIN, Versailles.
MALTE-BRUN, V. A., Paris.	WALKER, Gen. Francis A., LL.D., Boston.
	WRIGHT, Gen. Horatio G., U.S.A., Washington.
	WYSE, Lt.-Com. Lucien N. B., Paris.
	WHITEHOUSE, F. Cope.

FELLOWS.

CORRECTED TO DECEMBER 31, 1889.

Date of Election.

- 1859 Arnoux, Hon. William H.
1869 Auchmuty, Richard Tylden.
1871 Atterbury, Rev. Wm. W., D.D.
1872 Allen, Horatio M.,
S. Orange, N. J.
1873 Albert, Halpern.
1874 Alexander, Junius B.
1874 Avery, Samuel P. (L. F.)
1874 Agnew, John T. (L. F.)
1874 Allen, Henry Wilder.
1874 Amy, Henry. (L. F.)
1874 Agnew, Alexander McL.
1874 Astor, Hon. W. W. (L. F.)
1874 Appleton, D. S.
1875 Amsinck, Gustav.
1876 Appleton, Nathan.
1879 Austin, William.
1879 Agostini, Joseph.
1879 Ashley, L. Seymour.
1879 Astor, John Jacob. (L. F.)
1881 Armour, Herman O. (L. F.)
1883 Ames, Adelbert, Highlands, N. J.
1883 Aub, Albert.
1883 Atterbury, J. T. (L. F.)
1883 Aikman, Walter M.
1883 Adams, William.
1884 Abbott, Frank, M. D.
1884 Adler, I., M. D.
1885 Agnew, Andrew G.
1885 Adams, C. H.
1885 Auchincloss, E. S.
1886 Appleton. Wm. H.
1886 Agassiz, Prof. Alex.,
Cambridge, Mass.
1886 Allen, Chas. Slover, M. D.
1886 Alden, R. Percy.
1887 Andrews, Wm. L.
1887 Alexander, Robert C.
1887 Archbold, John D. (L. F.)
1887 Allen, Timothy Field.

Date of Election.

- 1888 Alexander, J. F.
 1889 Atkinson, C. P., Boston.
 1889 Albree, Joseph, Allegheny, Pa.
 1889 Alexander, E. P., Savannah, Ga.
 1889 Abbott, S. L., M.D., Boston.
 1889 Adams, Hon. Geo. E., Chicago.
 1889 Amory, Wm. N.
 1889 Atkinson, Hoffman.
 1889 Armstrong, David W.
 1889 Abbot, Edwin H., (I. F.)
 Boston.
 1852 Bancroft, Hon. George, (L. F.)
 Washington, D. C.
 1852 Barney, Hiram. (L. F.)
 1853 Brown, James M.
 1856 Baker, Francis. (L. F.)
 1859 Boorman, J. Marcus, (L. F.)
 Brooklyn, N. Y.
 1859 Bernheimer, Isaac.
 1859 Belmont, August. (L. F.)
 1865 Barnard, John. (L. F.)
 1868 Banks, David. (L. F.)
 1868 Bennett, James Gordon.
 1868 Bernheimer, Adolph.
 1868 Bernheimer, Simon.
 1869 Bailey, Jas. Mühlenberg. (L. F.)
 1869 Beyer, Goldsboro.
 1869 Bickmore, Prof. A. S.
 1869 Bierstadt, Albert. (L. F.)
 1870 Butler, Cyrus.
 1872 Brown, Walston H.
 1873 Bailey, N. P.
 1874 Bishop, D. W. (L. F.)
 1874 Bien, Julius.
 1874 Bartlett, Willard.
 1874 Bissinger, Philip.
 1874 Backus, Henry C. (L. F.)
 1874 Baldwin, Townsend B., (L. F.)
 Tuxedo Park, N. Y.

- 1874 Barnes, John S.
 1874 Bonner, Robert.
 1874 Barnard, Horace.
 1874 Benjamin, John.
 1874 Butler, William Allen.
 1874 Barr, William.
 1874 Belding, Milo M.
 1874 Bookstaver, Hon. Henry W.
 1874 Brownson, Commander W. H.,
 U. S. N. (L. F.), Washington,
 D. C.
 1875 Barney, Charles T.
 1875 Beaman, Charles C.
 1875 Bernheimer, J. A.
 1875 Beckwith, Leonard F.
 1875 Bedle, Hon. Jos. B.,
 Jersey City, N. J.
 1875 Beekman, Gerard.
 1875 Brownell, Silas B.
 1875 Barnes, William.
 1875 Beste, Henry.
 1875 Bredt, Ernest.
 1875 Belknap, Rear Adm. Geo. E.,
 U. S. N.
 1875 Bowie, Augustus, J., Jr.,
 San Francisco, Cal.
 1876 Brower, John.
 1876 Billings, Frederick. (L. F.)
 1877 Bixby, Robert F. (L. F.)
 1877 Börs, Christian.
 1877 Blanchard, George R.
 1877 Blatchford, Eliphalet W.,
 Chicago, Ill.
 1878 Bliss, Cornelius N. (L. F.)
 1878 Barton, Oliver Grant. (L. F.)
 1878 Brown, Rev. Philip A. H.
 1878 Brand, James.
 1878 Brown, J. Romaine.
 1879 Barattoni, C. A.
 1880 Banks, D. S. (L. F.)
 1881 Baldwin, Edwin.
 1881 Baldwin, Christopher C.
 1881 Babcock, Samuel D.
 1881 Backus, Henry Landon.
 1882 Bamberger, Jacob F.
 1882 Baldwin, Octavius D.
 1882 Ballin, Gustav N.
 1882 Bacon, Francis McNeil.
 1882 Babcock, George H.
 1882 Barger, Samuel F. (L. F.)
 1882 Barney, Newcomb C.
 1883 Bowen, Francis C.
 1883 Barclay, J. Searle.
 1883 Brewster, Benj. (L. F.)
 1883 Bachem, C. H.
 1883 Baker, Cyrus O.
 1883 Beekman, Wm. B.
 1883 Berry, Oliver F.
 1883 Bowne, Walter. (L. F.)
 1883 Banta, Theodore M.
 1883 Bangs, Charles W.
 1883 Barr, Edward.
 1883 Bergen, Tunis G.
 1883 Battell, Robbins.
 1883 Bennet, Ludovic.
 1883 Blake, Frederick D.
 1883 Bell, Capt. W. R.
 1883 Benson, Frank Sherman.
 1884 Bentley, Henry, (L. F.)
 Philadelphia, Pa.
 1884 Burrall, F. A., M.D.
 1884 Barton, Geo. De F.
 1884 Bangs, Fletcher H.
 1884 Bonner, G. T. (L. F.)
 1884 Brookfield, William.
 1884 Bassett, E. D.
 1885 Bliss, George T.
 1885 Burnet, Robt., Cincinnati, O.
 1886 Barker, P. C., M. D., (L. F.)
 Morristown, N. J.
 1886 Benjamin, Hon. S. G. W.
 1886 Brown, Hon. Addison. (L. F.)
 1886 Bridgman, E. C.
 1886 Buckley, Rev. J. M., D.D.
 1886 Bostwick, J. A. (L. F.)
 1886 Blakeman, Birdseye.
 1886 Bowers, John M.
 1886 Bruno, Richard M.
 1886 Bettens, Edward D.
 1886 Backus, J. Bayard.

- 1886 Bouvier, M. C.
 1886 Beddall, Edward F.
 1886 Berwind, Edward J.
 1886 Bliss, Alex., Washington, D. C.
 1886 Bond, Frank S.
 1886 Beattie, John.
 1887 Brown, Robt. I. (L. F.)
 1887 Boas, Dr. Franz.
 1887 Blagden, George.
 1887 Biglow, Lucius H. (L. F.)
 1887 Brown, Wm. C.
 1887 Bodine, Mordaunt.
 1887 Berrian, Charles M.
 1887 Bradley, Leonard A. (L. F.)
 1887 Booth, Fredk. A.
 1887 Bentley, John.
 1887 Braker, Conrad, Jr.
 1887 Bend, George H.
 1887 Belden, Josiah.
 1887 Barbey, Henry I. (L. F.)
 1887 Barron, John C., M.D. (L. F.)
 1888 Boyesen, Prof. H. H.
 1888 Bristow, Hon. Benj. H.
 1888 Booker, Wm. Lane.
 1888 Bogert, S. G.
 1888 Berghaus, Dr. Alex.
 1888 Buckham, George.
 1888 Bruce, Sanders D.
 1888 Bancroft, H. H., (L. F.)
 San Francisco, Cal.
 1888 Burgess, John W.
 1888 Brown, Wm. Smith.
 1888 Ballou, Maturin.
 1888 Breckinridge, Hon. Wm. C. P.,
 Lexington, Ky.
 1888 Baird, John.
 1888 Bacon, Lathrop R.
 1888 Bruen, Alexander J.
 1888 Bogert, Henry L.
 1888 Beers, M. H.
 1888 Barstow, J. Whitney, M.D.,
 Flushing, N. Y.
 1889 Barron, Clarence W., Boston.
 1889 Blake, Francis, Weston, Mass.
 1889 Benson, James H.
 1889 Beyer, John A.
 1889 Barnes, Thurlow Weed, Boston.
 1889 Bromberg, Fredk. G.,
 Mobile, Ala.
 1889 Bentley, Norman S.
 1889 Brimmer, Martin, Boston.
 1889 Biddle, Edward R.
 1889 Bigelow, Poultney. (L. F.)
 1889 Baring, Thos.
 1889 Bissell, Arthur F.
 1889 Brown, Wm. Reynolds.
 1889 Bowne, Robert.
 1889 Baldwin, W. D.
 1889 Bleything, Geo. Dacre, M.D.
 1889 Bidwell, Chas. E.
 1889 Bidwell, D. H.
 1889 Browning, J. H. Brower, M.D.
 1889 Birdsall, W. R., M.D.
 1889 Barnes, W. H., Philadelphia.
 1852 Colton, Joseph H. (L. F.)
 1855 Conklin, Col. Frederick A.
 (L. F.)
 1856 Cooper, Hon. Edward.
 1868 Catlin, N. W. Stuyvesant. (L.F.)
 1868 Chapman, Joseph H.
 1869 Cullum, Gen. George W.,
 U. S. Army. (L. F.)
 1870 Conklin, William A.
 1872 Conklin, Eugene E. (L. F.)
 1872 Crawford, Gen. S. W., U.S.A.
 1872 Clark, E. V.
 1874 Connery, Hon. T. B.
 1874 Campbell, Allan.
 1874 Church, Col. George E.,
 London, Eng.
 1874 Christern, F. W.
 1874 Chickering, Charles F.
 1874 Comstock, Cornelius.
 1874 Constable, James M.
 1874 Caswell, Wm. H.
 1874 Crocker, David.
 1874 Crosby, Hon. J. Schuyler,
 Tuxedo Park. N. Y.
 1874 Colgate, James B.

- 1874 Constantine, Andrew J.
 1874 Conyngham, Wm. L. (L. F.)
 1874 Crosby, Hiram B.
 1874 Crocker, Geo. A.
 1874 Chickering, George H.,
 Boston, Mass.
 1874 Carter, Oliver S., Orange, N. J.
 1875 Clendenin, J. W.
 1875 Cameron, Sir Roderick W. (L.F.)
 1875 Cushman, W. F., M.D.
 1875 Cooper, George C. (L. F.)
 1875 Chittenden, S. B.
 1876 Curtis, Benj. L.
 1879 Coddington, Gilbert S. (L. F.)
 1879 Caldwell, R. A., M.D.
 1879 Childs, George W.,
 Philadelphia, Pa.
 1880 Calvin, Delano C.
 1880 Cohen, Maurice S.
 1880 Coverly, William.
 1881 Clinton Henry L. (L. F.)
 1882 Clarkson, Banyer.
 1882 Coudert, F. R., LL.D.
 1882 Conkling, Rev. N. W.
 1883 Clarke, Thos. C.
 1883 Chapman, Henry E. (L. F.)
 1883 Chase, H. D.
 1883 Clyde, W. P.
 1883 Clews, Henry.
 1883 Coit, George M.
 1883 Candler, Flamen B.
 1884 Claffin, John. (L. F.)
 1884 Cook, John C.
 1884 Carey, Henry T.
 1884 Connor, W. E.
 1884 Cummings, Geo. F.
 1886 Cary, Alanson.
 1886 Collyer, Rev. Robt., D. D.
 1886 Conger, Clarence R.
 1886 Crosby, Rev. Howard, D.D.
 1886 Cooke, Henry C.
 1886 Casey, Col. T. L., U.S.A.
 1886 Coffin, Edmund, Jr.
 1886 Church, Benjamin S.
 1886 Corthell, E. L., Chicago.
 1886 Cornell, Chas B.
 1886 Clarke, Stephen G.
 1886 Carter, Henry C.
 1886 Chace, Hon. Jonathan,
 Washington, D. C.
 1886 Colvin, Verplanck, Albany, N. Y.
 1886 Clarke, C. C.
 1886 Calder, George.
 1886 Camp, Hugh N.
 1886 Chauncey, Elihu. (L. F.)
 1887 Clark, Jefferson.
 1887 Cheney, Alfred C.
 1887 Comstock, Anthony.
 1887 Cannon, H. W.
 1887 Conover, A. E.
 1887 Cranitch, Wm. I. A.
 1887 Curtis, Geo. Wm.
 1887 Compton, A. T.
 1887 Cleveland, Clement, M.D.
 1888 Colgate, Abner W.
 1888 Crimmins, John D.
 1888 Cotheal, Alex. I. (L. F.)
 1888 Crall, Leander H.
 1888 Chase, George.
 1888 Coutan, Adolphe R. (L. F.)
 1888 Coutan, Chas. Albert. (L. F.)
 1888 Clark, Alfred Corning. (L. F.)
 1888 Cook, Henry H.
 1888 Canda, Chas. J.
 1888 Coleman, James S.
 1888 Cross, Richard J.
 1888 Coston, Wm. F.
 1888 Chapin, Fred'k H.,
 Hartford, Conn.,
 1888 Chrystie, Wm. F.
 1888 Chisolm, George E.
 1888 Cochran, Wm. F. (L. F.)
 1888 Clement, Percival W.
 1889 Cox, Harry B. (L. F.)
 1889 Conger, A. L., Akron, O.
 1889 Clark, Chas. F.
 1889 Cheever, John D.
 1889 Crane, Chas. R., Chicago.
 1889 Clausen, George C.
 1889 Comstock, Geo. Carlton.

- 1889 Clark, Wm. Hancock.
 1889 Cole, Eugene M.
 1889 Carter, John J. (L. F.),
 Titusville, Pa.
 1855 Daly, Charles P., LL.D. (L. F.)
 1856 Douglass, Andrew E.
 1856 Dodge, Wm. E.
 1856 Detmold, Wm., M.D.
 1866 Darling, Hon. Wm. A.
 1868 Dwight, Prof. Theo. W.
 1868 Du Chaillu, Paul B.
 1870 Davis, Alexander J. (L. F.)
 1871 Daly, Hon. Joseph F.
 1873 Delano, Franklin H. (L. F.)
 1874 dePeyster, Gen. J. Watts. (L. F.)
 1874 Dutilh, Eugene.
 1874 Delafield, M. L.
 1874 Dana, Charles A.
 1874 del Monte, Leonardo.
 1874 Du Bois, Wm. A.
 1874 Dalrymple, Alexander,
 1874 Dunscombe, Richard T. (L. F.)
 1874 Dun, R. G.
 1875 Darrow, William.
 1875 Davies, Julien T.
 1875 Du Bois, Eugene.
 1875 Davison, Charles A.
 1875 de Peyster, Frederic J. (L. F.)
 1875 Dommerich, L. F.
 1877 Day, Henry M.
 1877 Davis, Joseph Beale. (L. F.)
 1878 di Cesnola, Gen. L. P.
 1879 Dahlgren, Charles B.,
 Trenton, N. J.
 1879 Dodge, George E.
 1880 Deane, John H. (L. F.)
 1880 Dyckman, Isaac M.
 1880 Du Bois, James G.
 1880 Du Bois, Frederick N.
 1880 Dexter, Henry. (L. F.)
 1880 Deen, William M. (L. F.)
 1881 Davies, H. B.
 1881 Docharty, Augustus T. (L. F.)
 1881 Dowd, William.
 1882 Dunham, George H.
 1882 Dunlap, Robert. (L. F.)
 1883 Donnell, E. J. (L. F.)
 1883 Decker, Jos. S.
 1884 Davis, Howland.
 1884 Day, Henry.
 1884 Donnelly, Thomas F.
 1884 Dodge, Richard J.
 1884 Dalley, Henry, Jr.
 1884 Douglas, Jas., Jr.
 1885 Dupré, Ovide. (L. F.)
 1885 De Witt, George G., Jr.
 1886 Dix, Rev. Morgan, D.D.
 1886 de Lancey, Edward F.
 1886 Dayton, Chas. W.
 1886 Drake, Chas. W.
 1887 de Lima, Edward, Boston, Mass.
 1887 Dickson, John.
 1887 Day, Prof. Edward H.
 1887 de Forest, George B.
 1887 Davenport, W. F., M.D.
 1887 Dodman, Alfred C.
 1887 de Castro, Hector.
 1887 Donald, James M.
 1887 Doudge, James R. (L. F.)
 1888 Davidson, Prof. Thos.
 1888 Donnelly, Edward C.
 1888 Dunham, James H.
 1888 Drexel, A. J., Philadelphia, Pa.
 1888 Drexel, Mrs. Joseph W.
 1888 Davenport, Hon. Ira, (L. F.)
 Bath, N. Y.
 1888 Dana, Richard S.
 1888 Dyer, E. Tiffany.
 1888 Dimpfel, Fred'k P.
 1889 Day, Thomas.
 1889 De Zeller, John R.
 1889 Denning, Edw. J.
 1889 Dodd, S. C. T.
 1889 Durkee, Eugene W.
 1889 Davison, Henry J.
 1889 Dwight, Jonathan, Jr.
 1889 Dupont, H. A., Wilmington, Del.
 1889 Dickson, James B.
 1889 Daley, Geo. H.

Fellows.

XXV

- 1889 Deal, W. E. F., Virginia City.
Nev.
- 1889 Donald, Peter.
- 1889 de Goicouria, A. V.
- 1889 Dexter, Julius, Cincinnati.
- 1889 Dix, J. Augustus, Elizabeth, N. J.
- 1859 Evarts, Hon. William M.
- 1868 Emmet, Thomas Addis, M.D.
- 1874 Eaton, Prof. D. Cady,
New Haven, Ct.
- 1875 Ellis, John W.
- 1875 Eimer, Charles.
- 1875 Ely, Richard S.
- 1877 Elderkin, John.
- 1878 Ellis, John, M.D.
- 1879 Earle, Ferdinand P.
- 1879 Elliott, Samuel. (L. F.)
- 1880 Eckert, Gen. Thomas T.
- 1882 Easton, Nelson S.
- 1882 Ellis, Wilbur Dixon.
- 1882 Eddy, Ulysses D.
- 1882 Edinger, August H.
- 1882 Edwards, Hon. J. Pierrepont,
Bartow on the Sound, N. Y.
- 1882 Emerson, J. W. (L. F.)
- 1882 Emmons, John.
- 1882 Earle, Joseph P. (L. F.)
- 1883 Eno, Amos F.
- 1883 Eyre, Maynard C.
- 1883 Earl, Wm. M.
- 1885 Elmore, Hon. J. Federico,
Washington, D. C.
- 1886 Easton, Robt. T. B. (L. F.)
- 1886 Ellis, Geo. W.
- 1886 Edwards, Walter.
- 1887 Ely, James R.
- 1887 Eckert, Wm. H.
- 1887 Elkins, S. B.
- 1887 Eastman, Timothy C.
- 1887 Eggleston, Melville.
- 1888 Edgecomb, Daniel W.
- 1888 Erben, Capt. Henry, U. S. N.
- 1888 Edmunds, Hon. George F.,
Burlington, Vt.
- 1889 Eldridge, Edward, Whatcom,
Wash.
- 1889 Emmet, Wm. T., Pelham, N. Y.
- 1889 Elliot, Mrs. M. Schuyler,
Brooklyn.
- 1889 Ewing, Jay.
- 1854 Field, Cyrus W. (L. F.)
- 1856 Field, Hon. David Dudley.
- 1856 Field, B. H. (L. F.)
- 1857 Fish, Hon. Hamilton.
- 1860 Field, Rev. H. M.
- 1864 Faile, Thomas H.
- 1871 Fliess, Wm. M.
- 1873 Freedman, Hon. John J.
- 1874 Farragut, Loyall.
- 1874 Fellows, John P.
- 1874 Fleet, Oliver S.
- 1874 Fox, Austen G. (L. F.)
- 1875 Foulke, Rev. Thomas.
- 1875 Fargo, James C.
- 1875 Fuller, Charles D.
- 1875 Ford, James B.
- 1875 Folsom, George W.
- 1876 Fisk, Gen. Clinton B. (L. F.)
- 1879 Fellows, John R.
- 1879 Ferris, Robert M.
- 1880 French, Hon. Stephen B.
- 1881 Fearing, William H.
- 1882 Fairbanks, Leland.
- 1882 Fellows, Charles H.
- 1883 Fisher, Eustace W., M.D. (L. F.)
- 1884 Fraser, Alfred.
- 1885 Frank, Elias L.
- 1886 Fitch, Chas. E., Rochester, N. Y.
- 1886 Flagler, H. M. (L. F.)
- 1886 Fiske, A. K.
- 1886 Fuller, W. H.
- 1886 Fettretch, Joseph.
- 1887 Foyé, Andrew J. C.
- 1887 Friedrichs, E. H.
- 1887 Fitzgerald, Louis.
- 1887 Fairfax, Hamilton R.
- 1887 Floyd, John Gelston.
- 1887 Fellows, Gordon.

- | | |
|--------------------------------------|---------------------------------------|
| 1888 Fish, Nicholas. | 1885 Glazier, Simon W. |
| 1888 Ferguson, Walton, (L. F.) | 1885 Gibson, George R. |
| Stamford, Conn. | 1886 Gallatin, Frederic. |
| 1888 Ford, Hon. Melbourne H., | 1886 Gray, George. |
| Grand Rapids, Mich. | 1886 Grummon, J. Ward. |
| 1889 Felton, Thos. Cary, Boston. | 1886 Georger, Louis F. |
| 1889 Frazar, Everett. | 1886 Gunther, W. H. |
| 1889 Fisk, Harvey Edward. | 1886 Gunther, Franklin L. (L. F.) |
| 1889 Farish, John T. | 1886 Gunther, Ernest Rudolph. |
| 1889 Fenton, David W. | 1886 Griffin, Chas. H. |
| 1889 Freeland, Theodore H. | 1886 Godwin, Parke. |
| 1889 Flint, Chas. R. | 1886 Goodwin, James J. (L. F.) |
| 1889 Felton, S. M., Jr. | 1886 Grant, James. |
| 1889 Freeman, Wm. C., Cornwall, Pa. | 1886 Godkin, E. L. |
| 1889 Fisher, Robt. C. | 1887 Goodridge, Frederic. |
| 1889 Fitzpatrick, Chas. J. | 1887 Grosvenor, Jas. B. M. (L. F.) |
| | 1887 Gould, George J. |
| 1886 Greenwood, Isaac J. | 1887 Gossler, Gustav H. |
| 1887 Greene, John W., M.D. (L. F.) | 1887 Grissold, John N. A. |
| 1888 Gebhard, Wm. H. (L. F.) | 1888 Goodwin, C. Ridgely, |
| 1888 Gerry, Elbridge T. (L. F.) | Baltimore, Md. |
| 1888 Green, Andrew H. | 1888 Goodwin, Chas. S. |
| 1889 Gilbert, Clinton. | 1888 Greene, Byron W. |
| 1872 Gerard, James W. | 1888 Gard, Anson A. |
| 1872 Grinnell, R. M., (L. F.) | 1888 Grafton, Joseph. |
| Skaneateles, N. Y. | 1889 Gillis, Chas. J. |
| 1873 Glaubenslee, Theo. G. | 1889 Grinnell, Geo. Bird. |
| 1874 Gunther, F. F. | 1889 Gilliss, Walter. |
| 1874 Gibbs, Theodore K. | 1889 Gurnee, Augustus C. |
| 1874 Galpen, Horace. | 1889 Gardiner, Dr. Edward G. |
| 1877 Guleke, H. F., M.D. | 1889 Gage, E. B., Tombstone, Arizona. |
| 1879 Graves, Arthur B. (L. F.) | 1889 Gourlie, Jno. H., Jr. |
| 1879 Gay, Joseph E. | 1889 Gilbert, G. K., Washington, D.C. |
| 1880 Gunning, William J., | 1889 Gargiulo, Joseph A. |
| Norwalk, Ct. | 1889 Gardner, John L., Boston. |
| 1881 Gallaway, R. M. | 1889 Gest, Erasmus, Cincinnati, Ohio. |
| 1881 Green, George. (L. F.) | |
| 1881 Giles, John C. | 1856 Hewitt, Hon. Abram S. |
| 1881 Grace, Hon. William R. (L. F.) | 1856 Hunt, Wilson G. |
| 1881 Garland, James A. | 1859 Havemeyer, John C. (L. F.) |
| 1882 Gallup, Albert. | 1864 Hammond, Henry B. (L. F.) |
| 1882 Gardiner, J. Grahame. | 1868 Huntington, Daniel. (L. F.) |
| 1883 Greenough, John. (L. F.) | 1868 Hall, Elial F. |
| 1883 Gotschalk, Felix. | 1868 Hadden, John A. (L. F.) |
| 1883 Goodridge, John C., Jr. (L. F.) | 1868 Hallock, Mrs. Frances. |

- 1870 Harrison, Prof. Thomas F.
 1871 Hand, Clifford A.
 1872 Holbrook, Levi. (L. F.)
 1873 Havemeyer, Hon. Theo. A.
 1874 Hoguet, Henry L.
 1874 Hurlbert, Henry A. (L. F.)
 1874 Haydock, George G.
 1874 Haines, John P.
 1874 Hinton, John H., M.D. (L. F.)
 1874 Holbrook, Edmund F.
 1874 Hendricks, Edmund.
 1874 Hendricks, Joshua.
 1874 Hatch, Rufus.
 1874 Huntington, C. P.
 1874 Hunter, Capt. Edward, U.S.A.,
 Fort Assiniboine, Mont.
 1874 Hoyt, Harlow M.
 1875 Houston, Col. D. C., U.S.A.
 1875 Hyde, Henry B.
 1875 Harper, P. J. A.
 1875 Harris, Sigmund.
 1875 Hun, Leonard G., Albany, N.Y.
 1876 Holt, Henry.
 1876 Hoes, Wm. M.
 1876 Hatfield, J. B. T.
 1878 Howe, George S.
 1878 Hinman, Wm. K.
 1878 Hitchcock, Hiram. (L. F.)
 1879 Hamilton, Wm. G.
 1879 Harris, Col. Robert.
 1880 Hall, Hayden H., Chicago, Ill.
 1880 Hickox, Charles R.
 1881 Hinman, Russell, Cincinnati, O.
 1881 Hoffman, Charles B.
 1881 Hamilton, Robert Ray. (L. F.)
 1882 Hascall, Theodore F.
 1882 Higginson, James J.
 1883 Hotchkiss, Horace L.
 1883 Hebert, Henry B.
 1883 Howell, George R.
 1883 Hyde, E. Francis.
 1883 Hurry, Edmund Abdy. (L. F.)
 1883 Hoyt, Alfred M. (L. F.)
 1883 Hendricks, Arthur T.
 1885 Hubbard, Walter, Meriden, Ct.
 1885 Homer, Chas. S., Jr.
 1885 Henry, Edward L.
 1886 Hoe, Robert.
 1886 Huidekoper, Arthur C.,
 Meadville, Pa.
 1886 Henderson, Harold G.
 1886 Hoyt, Colgate.
 1886 Hoffman, Rev. Eugene A., D.D.
 1886 Holt, Geo. C.
 1886 Hawley, E. Judson.
 1886 Hildreth, David M.
 1886 Hinds, Joseph E.
 1886 Hitchcock, Bradford W.
 1886 Hillhouse, Thomas G.
 1887 Hinchman, Walter.
 1887 Hastings, Prof. Thos. S., D.D.
 1887 Huntington, Geo. S., M.D.
 1887 Hague, James D.
 1887 Hurd, S. H., M.D.,
 Skaneateles, N. Y.
 1887 Hunker, Lieut. J. J., U.S.N.
 1887 Horsford, Prof. E. N.,
 Cambridge, Mass.
 1887 Hopping, A. Howard.
 1887 Hayes, Richard Somers.
 1887 Howell, Theodore D.
 1887 Hodgman, George F.
 1887 Hill, James K.
 1887 Hoadly, Hon. George.
 1887 Holbrook, Edward.
 1888 Henderson, John C.
 1888 Hard, Anson W.
 1888 Hoyt, Henry R. (L. F.)
 1888 Hyde, John.
 1888 Hathaway, Horatio,
 New Bedford, Mass.
 1888 Hammond, Charles E.
 1888 Hayward, James W.
 1888 Higley, Hon. Warren.
 1888 Harbeck, Chas. T.
 1889 Huntington, Chas. P. (L. F.)
 1889 Hinrichs, C. F. A.
 1889 Haynes, Prof. Henry W., Boston.
 1889 Hastings, W., Wilmington, Del.
 1889 Hurtt, Frank D. (L. F.)

- 1889 Harden, Hon. Wm. D.,
 Savannah, Ga.
 1889 Heilprin, Prof. Angelo,
 Philadelphia.
 1889 Hayden, Brace.
 1889 Harper, Orlando M.
 1889 Hazard, Rowland,
 Providence, R. I.
 1889 Hubbard, Gardiner G.,
 Washington, D. C.
 1889 Hamilton, Edmund Horace.
 1889 Higbee, Rev. Chas.,
 Pelham, N. Y.
 1889 Hendrie, Wm. C.
 1889 Hallidie, A. S., San Francisco.
 1889 Hitchcock, Welcome G. (L. F.)
 1889 Hogg, T. Eginton.
 1889 Henderson, Norman.
 1889 Holloway, Josephus F.
 1889 Hoagland, C. N., M.D., (L. F.)
 Brooklyn.
 1889 Hardy, John L., Savannah, Ga.
 1889 Harrower, H. D.
 1889 Howells, Henry C.
 1889 Hain, Frank K.
 1889 Halsted, James M.
 1889 Harper, Edward B.
 1889 Henley, Wm. I.
 1889 Harriot, Samuel C. (L. F.)
 1889 Hackstaff, Alexander G.

 1859 Ireland, John B.
 1874 Iselin, Adrian, Jr.
 1881 Ives, Brayton. (L. F.)
 1883 Ives, James M.
 1886 Irving, John Treat.
 1887 Isham, Charles. (L. F.)
 1887 Inslee, Samuel.
 1887 Ivison, David B. (L. F.)
 1888 Irving, Cortlandt.
 1889 Ickelheimer, Isaac.

 1852 Jay, Hon. John. (L. F.)
 1852 Jones, John D. (L. F.)
 1868 Johnson, Hezron A.

 1871 Jones, Walter R. T.
 1874 Judson, Wm. D.
 1874 Jesup, M. K. (L. F.)
 1874 Jaffray, Edward S.
 1874 Jenkins, Wm. L.
 1874 James, D. Willis.
 1874 Jameson, Joseph A.
 1874 Jaffray, Robert.
 1879 Jay, William.
 1880 Jewett, George L.
 1881 Jewett, Hugh J., Glenville, Md.
 1881 Johnson, Bradish, Jr.
 1882 Jasper, John.
 1883 Judson, A. M.
 1885 Juilliard, A. D.
 1886 Janeway, Henry L.,
 New Brunswick, N. J.
 1886 Jacobi, A., M.D.
 1886 Jennings, O. B.
 1886 Jackson, Rev. Samuel M.
 1886 Janvrin, J. E., M.D.
 1887 Jenkins, Augustus S.
 1888 Jones, Oliver L. (L. F.)
 1888 Jeffries, W. Lloyd, Boston, Mass.
 1888 Jackson, Oswald.
 1888 Johnson, George F.
 1888 Jarvis, S. M., Kansas City, Mo.
 1889 Jayne, Frank A.
 1889 James, Geo. Abbot.

 1869 Kelly, Eugene.
 1870 Kühne, Frederick.
 1872 Kendrick, Col. H. L., U.S.A.
 1873 Kennan, George, (L. F.)
 Washington, D. C.
 1874 King, Edward.
 1874 Kearny, Joseph R.
 1874 Kunhardt, Henry R.
 1874 Kingsland, Wm. M. (L. F.)
 1874 Kalbfleisch, Charles H.
 1874 Keck, Thomas.
 1876 Knauth, Percival. (L. F.)
 1877 King, Clarence. (L. F.)
 1878 Kernochan, Jas. Lorillard. (L. F.)
 1879 Kane, S. Nicholson.

- 1880 Keene, James R. (L. F.)
 1881 Kennedy, John S. (L. F.)
 1881 Kane, Grenville. (L. F.)
 1881 Kirsch, Louis, Brooklyn, N. Y.
 1882 King, Le Roy.
 1882 King, George Gordon.
 1882 King, Vincent C. (L. F.)
 1883 Kneeland, Henry T.
 1883 Knapp, S. P.
 1883 Kohn, Julius A.
 1883 Kerr, Walter.
 1883 King, D. H. Jr.
 1884 Kountze, Augustus. (L. F.)
 1884 Kahn, Dr. Hermann.
 1885 Keane, Joseph.
 1885 Keppler, Rudolph. (L. F.)
 1886 Kurtz, William.
 1886 Kendall, Edward H.
 1886 Kidder, Camillus G. (L. F.)
 1886 Karner, W. J., Chicago, Ill.
 1887 Knevals, Caleb B.
 1887 Knudson, Morris F.
 1887 Knight, George T. (L. F.)
 1887 Kevan, William.
 1887 Knox, John Jay.
 1888 Kelly, Edward. (L. F.)
 1888 Kissel, Gustav E.
 1888 Knox, Herbert H.
 1888 Kellogg, Charles, Athens, Pa.
 1888 Kennedy, H. Van Rensselaer.
 1889 Kauffmann, S. H.,
 Washington, D. C.
 1889 Koch, Peter, Bozeman, Montana.
 1889 Keogh, Martin J., Pelham, N. Y.
 1889 Kimber, Henry, M. P., London.
 1889 Kimball, F. J., (L. F.)
 Philadelphia.
 1889 Kobbe, Walter.
 1852 Livingston, Cambridge. (L. F.)
 1857 Low, Abiel A. (L. F.)
 1859 Lathers, Richard. (L. F.)
 1869 Lawrence, John S. (L. F.)
 1870 Loew, Hon. Frederick W.
 1870 Lyman, Edward H. R.
 1871 Letson, Robert S.
 1871 Larremore, Richard L., LL.D.
 1872 Libbey, William. (L. F.)
 1874 Lauterbach, Edward.
 1874 Livingston, Robert J. (L. F.)
 1874 Langdon, Walter, (L. F.),
 Hyde Park, N. Y.
 1874 Lorillard, Pierre, (L. F.)
 1874 Littlejohn, James,
 Brooklyn, N. Y.
 1874 Lawrence, Joseph B.
 1874 Le Comte, Joseph.
 1874 Lewis, Walter H.
 1874 Lawson, Leonidas M.
 1874 Leshner, Stephen R.
 1875 Low, Hon. Seth. (L. F.)
 1875 Lawrence, George N.
 1876 Low, A. Augustus. (L. F.)
 1878 Loubat, J. F., LL.D. (L. F.)
 1878 Leon, Nestor Ponce de.
 1879 Levy, Augustus H.
 1880 Lang, Alexander.
 1880 Lee, William H.
 1881 Libbey, Prof. William, Jr., (L. F.)
 Princeton, N. J.
 1881 Langdon, Woodbury G. (L. F.)
 1881 Little, Joseph J. (L. F.)
 1881 Livermore, Edwin R.
 1881 Lee, J. Bowers.
 1882 Lambert, Edward.
 1882 Langdon, Woodbury.
 1882 Lamont, Lansing.
 1882 Lapham, Lewis H.
 1882 Lamborn, Robert H.
 1883 Lourie, J.
 1883 Lummis, William.
 1883 Lounsbery, R. P.
 1886 Leete, C. H.
 1886 Ludington, C. H. (L. F.)
 1886 Lee, Wm. H. L.
 1887 Lord, Daniel, Jr.
 1887 Littlefield, Frederick M.
 1887 Langmann, G., M.D.
 1887 Lewis, James F.
 1887 Lester, Henry M.

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| 1887 Logan, Walter S. | 1875 Marcus, Arnold. |
| 1887 Lodge, Hon. Henry Cabot,
Boston, Mass. | 1875 Magoun, George C. |
| 1887 Lovell, John W. | 1875 Maclay, Moses B. |
| 1887 Loomis, Alfred L., M.D. | 1875 Martin, Bradley. (L. F.) |
| 1887 Lee, Homer. | 1875 Meyer, L. H. |
| 1888 Lespinasse, George S. | 1875 McLanahan, Geo. William. |
| 1888 Lancaster, R. A. | 1876 Mitchell, W. Howard. |
| 1888 Lynch, James D. (L. F.) | 1877 Matsell, Geo. W.,
Anamosa, Iowa. |
| 1888 Lawton, James M. (L. F.) | 1878 Musgrave, Thomas B. (L. F.) |
| 1888 Lawson, James. | 1878 Mason, Lieut. T. B. M.,
U.S.N. (L. F.) |
| 1889 Lewis, Richard V. | 1879 Marshall, William I.,
Chicago, Ill. |
| 1889 Lovell, Frank H., Brooklyn. | 1879 Mather, Frederick E. |
| 1889 Law, Walter W. | 1879 Motz, Ferdinand. |
| 1889 Lydig, David. | 1879 Miller, John Bleecker. |
| 1889 Lowthian, Thos., Denver, Colo. | 1879 Monteith, James. |
| 1889 Lagrave, John J. | 1880 Mills, D. O. (L. F.) |
| 1889 Le Roy, Edward A. | 1880 Massey, Wm. M. |
| 1889 Lockman, Jacob K. | 1882 Marquand, John P. |
| 1853 Moore, George H. (L. F.) | 1882 Marsh, Caleb P. |
| 1856 Monroe, Ebenezer, Southport, Ct. | 1882 McWilliam, John, |
| 1859 MacMullen, Prof. John. | 1882 Moore, W. T. |
| 1859 Morrell, Wm. H. (L. F.) | 1882 Mead, Erastus F. |
| 1859 Moore, Frank. (L. F.) | 1882 Markoe, F. H., M.D. (L. F.) |
| 1863 Moore, W. H. H. (L. F.) | 1883 Marvel, William D. |
| 1864 Morton, Hon. Levi P. (L. F.) | 1883 Mackay, Donald. (L. F.) |
| 1868 Morrison, Henry. | 1883 McCreery, James. (L. F.) |
| 1868 Martin, Isaac P. | 1883 Morgan, E. D. |
| 1868 Marquand, Henry G. (L. F.) | 1883 Mali, Charles. |
| 1870 Marbury, Francis F. | 1884 Moore, Joseph, Jr., (L. F.)
Philadelphia, Pa. |
| 1872 Meyer, F. William. | 1884 Myers, Andrew G. |
| 1872 Marié, Peter. (L. F.) | 1884 MacKellar, Wm. (L. F.) |
| 1873 Moore, C. B. | 1885 Mackenzie, D. E. |
| 1874 Morris, Henry L. (L. F.) | 1885 Morison, George S. (L. F.) |
| 1874 Marble, Manton. | 1886 Muñoz, J. M. (L. F.) |
| 1874 Morgan, W. F. | 1886 Murray, James B. |
| 1874 Moir, James. | 1886 Moore, John G. |
| 1874 Morgan, J. Pierpont. (L. F.) | 1886 Moses, Raphael J., Jr. |
| 1874 McAlpine, David H. | 1886 Macklin, John J. |
| 1874 Merrill, William J. (L. F.) | 1886 Morgan, N. Denison. |
| 1874 Moulton, Clarence F. | 1886 MacFarland, James. |
| 1875 Mitchell, Edward. | 1887 Morgan, Wm. Fellowes. (L. F.) |
| 1875 Macy, Arthur, Silver King,
Arizona. | |

- 1887 Malcolm, William L.
 1887 Mitchell, Hubbard W., M.D.
 1887 Metcalfe, John T., M.D.
 1887 Macy, Isaac A.
 1887 McCourt, P. J., M.D.
 1887 Mack, Jacob W.
 1887 Mali, Henry W. T.
 1887 Meyer, Alfred, M.D.
 1887 Moulton, Franklin W.
 1887 Montgomery, Warwick E.
 1887 McCready, N. L.
 1887 Morton, Alexander L.
 1888 Marquand, Henry. (L. F.)
 1888 Morgan, Rev. D. Parker.
 1888 Montant, Jules A.
 1888 Mason, Alex. T. (L. F.)
 1888 Malcolm, Chas. E.
 1888 Moss, Mrs. J. Osborne.
 1888 Mayo, Dr. Wm. Starbuck.
 1888 Myers, Theodore W.
 1888 Milhau, Gen. John J. (L. F.)
 1888 Mather, Samuel, Cleveland, O.
 1888 Mead, Edwin, Jr.
 1888 McGill, Geo. W.
 Riverdale-on-Hudson, N. Y.
 1888 Moore, Cary W.
 1888 Martin, Oswald J. (L. F.)
 1888 McGee, James, Plainfield, N. J.
 1888 McKeever, J. Lawrence.
 1889 Martin, Rob't. C.
 1889 McCormick, Hon. R. C.,
 Jamaica, N. Y.
 1889 Marsland, Dr. Geo.
 1889 Mead, Edwin H.
 1889 MacFarland, Wm. W.
 1889 McBryde, J. M., Columbia, S. C.
 1889 Mayes, Edward, University,
 Miss.
 1889 Milliken, James, Bellefonte, Pa.
 1889 Maitland, Alexander. (L. F.)
 1889 Macdonough, James.
 1889 Mortimer, W. Y.
 1889 Morgan, Wm. H.
 1889 Marié, Léon.
 1874 Newell, John, (L. F.), Chicago, Ill.
 1874 Niles, William W.
 1880 Nelson, William.
 1882 Nisbet, John L.
 1882 Naylor, Joseph.
 1882 Nelson, Richard.
 1883 Noble, Charles C. (L. F.)
 1884 Neumoegeen, B.
 1884 Newberry, Dr. John S.
 1885 Nelson, Rev. George Francis.
 1886 Neilson, James,
 New Brunswick, N. J.
 1886 Notman, John.
 1886 Neftel, W. B., M.D. (L. F.)
 1887 Neels, John N.
 1887 Noyes, William C.
 1889 Nunn, R. J., M.D.,
 Savannah, Ga.
 1889 Newton, Daniel H.,
 Holyoke, Mass.
 1874 Ottendorfer, Oswald. (L. F.)
 1874 Olyphant, Robert M.
 1874 Owen, Frederick N.
 1875 Otterbourg, Marcus.
 1875 Ottiwell, John D.
 1875 O'Connor, Thomas H. (L. F.)
 1875 Opdyke, William S. (L. F.)
 1877 O'Gorman, Hon. Richard.
 1879 O'Gorman, Richard, Jr.
 1879 O'Brien, Thomas S. (L. F.)
 1880 O'Shaughnessy, John W. (L. F.)
 1881 Oakley, Henry A.
 1882 Osborn, W. H. (L. F.)
 1882 Oppenheim, Edward L.
 1882 Osgood, William H.
 1882 Otis, Col. Charles G.,
 Brooklyn, N. Y.
 1883 O'Donohue, Jos. J.
 1886 O'Brien, Morgan J.
 1887 Oldham, J. Leslie.
 1887 Ogden, William B. (L. F.)
 1888 Oakes, T. F., (L. F.)
 St. Paul, Minn.
 1889 Openhym, Wm.

- 1889 O'Connor, Wm. P.
 1889 Orr, Alexander E.
- 1852 Poor, Henry V. (L. F.)
 1855 Pierrepont, Hon. Edwards.
 1857 Pyne, Percy R. (L. F.)
 1862 Phillips, George W.
 1868 Powers, William P.
 1868 Paulison, John P.
 1871 Peabody, Hon. Charles A.
 1872 Parish, Henry. (L. F.)
 1874 Peabody, Arthur J.
 1874 Penfold, William Hall.
 1874 Potter, Hon. Orlando B.
 1874 Pondir, John.
 1874 Porter, John K.
 1874 Packer, Elisha A.
 1874 Powers, George J.
 1874 Pellew, Henry E., Katonah, N.Y.
 1874 Prichard, William M.
 1875 Prentice, W. P.
 1875 Pfund, Anton.
 1875 Porter, Gen. Horace.
 1876 Plum, James R.
 1878 Parsons, Edwin.
 1880 Pinchot, James W.
 1880 Powell, Wilson M.
 1881 Post, Charles A.
 1882 Parsons, Wm. (L. F.)
 1882 Parrish, James C. (L. F.)
 1882 Pell, Wm. Cruger.
 1882 Parsons, Joseph H.
 1882 Parsons, Samuel.
 1882 Paton, John.
 1882 Platt, Thos. C.
 1882 Parsons, John E.
 1882 Parsons, Charles.
 1882 Peck, Charles M.
 1882 Parsons, Mrs. E. (L. F.)
 1883 Parks, Robert H. (L. F.)
 1884 Post, George B.
 1884 Place, George.
 1884 Purdy, John F.
 1884 Plush, Dr. Samuel M., (L. F.)
 Philadelphia, Pa.
- 1885 Post, Wm. Henry. (L. F.)
 1885 Parker, George A.
 1885 Planten, J. R. (L. F.)
 1885 Pell, Charles E.
 1886 Phoenix, Phillips. (L. F.)
 1886 Pearsall, T. W.
 1886 Pryer, Chas., New Rochelle, N.Y.
 1886 Parris, Edward L.
 1887 Phoenix, Lloyd. (L. F.)
 1887 Perdicaris, Ion.
 1887 Peaslee, Wyllys G.,
 Dubuque, Iowa.
 1887 Peters, George A., M.D.
 1887 Parsons, Wm. H.
 1887 Putney, Daniel.
 1887 Pearson, Frederick.
 1887 Peters, Samuel T.
 1887 Parsell, Henry V.
 1888 Post, H. A. V.
 1888 Parsons, John H.
 1888 Peabody, Joseph, Boston, Mass.
 1888 Perry, William A.
 1888 Paine, Robert Treat,
 Boston, Mass.
 1888 Phillips, Wm. D.
 1888 Prescott, Geo. B.
 1888 Paddock, Hon. A. S.
 Beatrice, Neb.
 1889 Pickering, Prof. Ed. C.,
 Cambridge, Mass.
 1889 Prince, Fred'k O., Boston, Mass.
 1889 Palmer, S. S.
 1889 Peabody, John E., Boston, Mass.
 1889 Peck, Charles E.
 1889 Phillips, Frederic D.
 1889 Putnam, Geo. L.
 1889 Pell, Walden.
 1889 Prince, Col. W. E., U. S. A.
 1889 Peabody, Francis H.,
 Boston, Mass.
 1889 Pirsson, J. W.
 1889 Palmer, Wm. J.
 1883 Quackenbos, John D., M.D.
 1883 Quinlin, Leonard G.

- 1854 Rutherford, L. M., LL.D.
 1856 Randolph, Anson D. F.
 1856 Remsen, William. (L. F.)
 1856 Riker, John H.
 1861 Rogers, C. B. (L. F.)
 1868 Raven, Anton A. (L. F.)
 1868 Rose, Cornelius.
 1872 Robbins, Chandler. (L. F.)
 1874 Reid, Whitelaw.
 1874 Richard, Auguste. (L. F.)
 1874 Rogers, H. Livingston.
 1874 Riker, William J.
 1874 Reynes, Jaime.
 1874 Rhoades, John H.
 1875 Roosevelt, Clinton.
 1875 Read, Gen. Meredith., (L. F.)
 Paris, France.
 1875 Rose, Charles.
 1876 Ross, William B.
 1878 Roorbach, Orville A.
 1878 Rainey, Thomas, M.D.,
 Ravenswood, N. Y.
 1879 Rhineland, Miss J. (L. F.)
 1880 Robinson, Mrs. John A. (L. F.)
 1881 Randolph, J. C. F.
 1881 Robbins, George A.
 1881 Rhineland, Frederick W.
 1882 Rinehart, E.
 1882 Ray, James D.
 1882 Robbins, S. H.
 1882 Redding, W. E.
 1882 Rolston, Roswell G.
 1882 Rhineland, Charles E.
 1882 Rathborne, C. L.
 1883 Rosenbaum, Albert S.
 1883 Richardson, Briton.
 1883 Rowland, Thomas F. (L. F.)
 1886 Raymond, R. W.
 1886 Roys, Geo. B.
 1886 Rice, Isaac L. (L. F.)
 1886 Ransom, Rastus S.
 1887 Remsen, Robert Geo. (L. F.)
 1887 Ruggles, James Francis.
 1887 Robertson, R. H.
 1887 Robb, Hon. J. Hampden. (L. F.)
 1887 Read, Daniel P.
 1887 Rowell, Geo. P. (L. F.)
 1887 Rogers, Archibald. (L. F.)
 1887 Rice, Henry.
 1887 Robertson, T. S., M.D.
 1888 Russell, Henry E.
 1888 Riker, Daniel S.
 1888 Roe, Alfred.
 1888 Ropes, Chas. H.
 1888 Rhineland, Wm.
 1888 Renwick Edward S.
 1888 Richter, Dr. C. M.,
 San Francisco, Cal.
 1888 Russell, Hon. John E.,
 Leicester, Mass.
 1888 Robinson, Wm. M.
 1888 Reiley, Robt. T.
 1889 Ropes, John C., Boston, Mass.
 1889 Rice, Prof. J. M., Annapolis, Md.
 1889 Robert, Fred'k.
 1889 Russell, Samuel H., Boston, Mass.
 1889 Rowe, Wm. H.,
 Salt Lake City, Utah.
 1889 Roelker, Alfred. (L. F.)
 1889 Reynolds, Clinton G.
 1889 Ross, W. A.
 1889 Renauld, Charles.
 1889 Roberts, Rev. Wm. C.,
 Lake Forest, Ill.
 1889 Reed, J. Van D. (L. F.)
 1889 Ribon, Juan G., Jersey City, N. J.
 1889 Rogers, N. Pendleton.
 1889 Ryan, Thos. F.
 1856 Spofford, Paul N.
 1856 Schermerhorn, Wm. C.
 1856 Sherman, W. Watts.
 1859 Schultz, John H. (L. F.)
 1860 Stout, Francis A. (L. F.)
 1869 Strebeigh, Robert M.
 1870 Sherwood, John.
 1870 Schafer, Samuel M., (L. F.)
 1870 Schafer, Simon. (L. F.)
 1870 Seligman, James.
 1870 Seligman, Jesse.

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| 1871 Shaler, Gen. Alexander,
Ridgefield, N. J. | 1877 Shearman, William P. (L. F.) |
| 1871 Swan, William H. | 1877 Sandford, Gen. Henry S.,
Birmingham, Ct. |
| 1872 Steiger, E. | 1877 Sanger, Major Joseph P., U.S.A. |
| 1872 Stuyvesant, Rutherford. (L. F.) | 1877 Schaff, Rev. Philip, D.D. |
| 1873 Sturges, Frederick. | 1877 Schuyler, Philip. |
| 1873 Spencer, James C. | 1878 Stewart, William Rhinelander. |
| 1873 Scott, Julian., (L. F.)
Plainfield, N. J. | 1878 Sands, William R. (L. F.) |
| 1873 Southworth, Alvan S. (L. F.) | 1878 Smith, S. Newton. |
| 1873 Sturgis, Frank K. (L. F.) | 1878 Sabla, Theodore de Joly de. |
| 1874 Sands, Henry M. | 1879 Stevens Frederic W. (L. F.) |
| 1874 Steinway, William. | 1879 Smith, E. Reuel. (L. F.) |
| 1874 Sloan, Samuel. | 1879 Smith, Herbert H.,
Brooklyn, N. Y. |
| 1874 Schermerhorn, F. Augustus. (L. F.) | 1879 Shields, Prof. Charles W.,
Princeton, N. J. |
| 1874 Stuyvesant, Robert R. | 1879 Stetson, Francis Lynde. |
| 1874 Stuart, Joseph. | 1880 Southwick, Henry K. (L. F.) |
| 1874 Strong, W. L. (L. F.) | 1882 Sass, Dr. Luis F. |
| 1874 Steward, D. Jackson. | 1882 Schuyler, Spencer D. (L. F.) |
| 1874 Shethar, Samuel. | 1882 Sayre, Lewis A., M.D. (L. F.) |
| 1874 Schieffelin, Samuel B. | 1882 Scott, George S. |
| 1874 Stilwell, Benjamin M. | 1882 Skidmore, Wm. L. |
| 1874 Sawyer, Warren, Boston, Mass. | 1882 St. John, W. P. |
| 1874 Sands, Andrew H. | 1882 Scribner, Charles. |
| 1874 Schaus, William. | 1883 Schermerhorn, Charles A. |
| 1874 Spinney, Joseph S. | 1883 Simpson, George E. |
| 1874 Striker, J. A. | 1883 Stone, Sumner R. |
| 1875 Stanford, William H. | 1883 Sinclair, John. (L. F.) |
| 1875 Smith, Lewis Bayard. | 1883 Spence, Lewis H. |
| 1875 Sturges, Henry C. | 1883 Smith, William Alex. |
| 1875 Stewart, Col. Charles Seaforth,
Cooperstown, N. Y. | 1883 Smith, Henry N. |
| 1875 Schultz, Carl H. | 1883 Stern, Louis. |
| 1875 Sandford, Elliott. (L. F.) | 1883 Sanger, Wm. Cary. |
| 1875 Stranahan, J. S. T.,
Brooklyn, N. Y. | 1883 Scott, Rufus L. |
| 1875 Schieffelin, H. Maunsell. | 1883 Sorzano, Julio F. |
| 1875 Schiff, Jacob H. (L. F.) | 1883 Spicer, Elihu, Jr. (L. F.) |
| 1875 Smith, Augustine. | 1884 Schley, J. Montfort, M.D. |
| 1876 Smith, Harsen H. | 1884 Schwatka, F., Rock Island, Ill. |
| 1876 Sibley, Hiram W. (L. F.) | 1884 Shannon Robert H. |
| 1876 Spaulding, Henry F. | 1884 Stokes, James. |
| 1876 Stryker, Gen. William S.,
Trenton, N. J. | 1885 Storer, Albert. |
| 1876 Stone, Andros B., Chicago, Ill. | 1885 Sturgis, Russell. |
| | 1885 Slote, Henry L. |
| | 1885 Stanton, S. Franklin. |

- 1885 Storm, Walton.
 1885 Schmelzel, Wm. R.
 1886 Stevens, Rev. C. Ellis.
 1886 Sherman, Prof. O. T.,
 Cambridge, Mass.
 1886 Sherman, George.
 1886 Schuyler, Geo. L.
 1886 Starr, Egbert.
 1886 Satterlee, F. Le Roy, M.D.
 1886 Sturgis, F. R., M.D.
 1886 Smith, Edwin B.
 1886 Snead, Thomas L.
 1887 Stewart, Lisenard.
 1887 Sutton, Rev. J. Ford, D.D.
 1887 Schell, Robert.
 1887 Seessel, A., M.D.
 1887 Swain, George F., Passaic, N. J.
 1887 Sawyer, Lieut. J. Estcourt, U.S.A.
 1887 Seligman, Dewitt J.
 1887 Smith, Jas. Rufus.
 1887 Smith, Nathaniel S.
 1887 Sellew, T. G.
 1887 Satterthwaite, Thos. E., M.D.
 1887 Stetson, George W. (L. F.)
 1887 Satterlee, S. K.
 1887 Sterry, George E.
 1887 Shortall, John G., Chicago, Ill.
 1887 Serrell, Gen. Edward W.
 1887 Stickney, Austin.
 1887 Stevens, George T.
 1888 Stephens, Benjamin.
 1888 Stickney, Albert.
 1888 Stuart, Inglis.
 1888 Smith, Nelson.
 1888 Sprague, Henry E.
 1888 Salisbury, Stephen, (L. F.),
 Worcester, Mass.
 1888 Smith, A. Cary.
 1888 Stott, Frank H., (L. F.)
 Stottville, N. Y.
 1888 Starbuck, Wm. H.
 1888 Smythe, Rev. Hugh.
 1888 Sheldon, Edwin B., Chicago, Ill.
 1888 Schell, Edward.
 1888 Skiddy, Wm. W., Stamford, Conn.
 1888 Shipman, Charles M.,
 Jersey City.
 1888 Sherman, Charles A.
 1888 Shultze, John S. (L. F.)
 1888 Sturgis, Robert.
 1889 Sackett, Chas A.
 1889 Smith, Philip Sherwood,
 Buffalo, N. Y.
 1889 Squibb, E. R., Brooklyn.
 1889 Smith, Prof. Chas. Sprague.
 1889 Smith, Pierre J.
 1889 Steinbrügge, E.
 1889 Sellers, Wm., Philadelphia.
 1889 Spies, Francis. (L. F.)
 1889 Screven, Col. John,
 Savannah, Ga.
 1889 SooySmith, Chas.
 1889 Smith, Henry A.
 1889 Sutton, Woodruff.
 1889 Steel, W. G., Portland, Oregon.
 1889 Sackett, Henry W.
 1889 Straus, Isidor.
 1889 Sullivan, Arthur T.
 1856 Tiffany, Charles I.
 1856 Townsend, Randolph W.
 1868 Taylor, Douglas.
 1870 Tuckerman, Lucius.
 1870 Thomson, James.
 1872 Tower, Gen. Z. B., U.S.A.
 1874 Thompson, David G. (L. F.)
 1874 Tiemann, Peter C.
 1874 Trevor, John B.
 1874 Taylor, Alfred J.
 1874 Turner, Herbert B.
 1875 Taintor, Charles M.
 1875 Terry, Gen. Alfred H., U.S.A.
 1875 Toel, William.
 1875 Terbell, Henry S.
 1876 Terry, Rev. Roderick.
 1877 Tillinghast, William H.
 1877 Talcott, James. (L. F.)
 1879 Turnbull, Robert J.,
 Morristown, N. J.
 1880 Tailer, William H.

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| 1881 Thompson, R. H., Troy, N. Y. | 1889 Underhill, A. M. |
| 1882 Thurber, H. K. | |
| 1882 Taber, Henry M. (L. F.) | 1854 Viele, Gen. Egbert L. |
| 1882 Thomson, Eugene. | 1868 Van Santvoord, C. |
| 1882 Tailer, Edward N. (L. F.) | 1870 Van Brunt, Hon. Chas. H. (L. F.) |
| 1882 Terry, John T. (L. F.) | 1874 Van Rensselaer, Kilian. |
| 1882 Taintor, Giles E. | 1875 Van Buren, John D. |
| 1883 Twombly, Hamilton McK. | 1875 Valentine, Lawson. |
| 1883 Trumbull, Rev. H. Clay, D.D.,
Philadelphia, Pa. | 1875 von Post, H. C. (L. F.) |
| 1883 Thalmann, Ernest. | 1875 Vanderpoel, A. Ernest. |
| 1883 Terry Edmund. | 1876 Van Hoesen, Hon. George M. |
| 1884 Taltavall, Wm. A. | 1876 Van Brunt, Cornelius. |
| 1884 Turner, J. Spencer. | 1877 Vanderbilt, Cornelius, (L. F.) |
| 1884 Thoron, Joseph. | 1878 Vanderbilt, William K. (L. F.) |
| 1885 Tone, T. Wolfe. | 1880 von Hesse, Christian. |
| 1885 Tiffany, Rev. C. C., D.D. | 1881 Vantine, A. A. |
| 1885 Turnure, Lawrence. | 1883 Van Sinderen, Adrian. |
| 1886 Thorne, Jonathan. | 1884 Van Siclen, Geo. W. |
| 1887 Turnbull, William. | 1885 Valentine, Henry C. |
| 1887 Talbot, Charles N. | 1886 Valenzuela, Enrique. |
| 1887 Ten Eyck, Sandford R. | 1887 Voorhees, Charles H., M.D.,
New Brunswick, N. J. |
| 1887 Talmadge, Henry. | 1887 Van Alen, J. J. (L. F.) |
| 1887 Thompson, Frederic F. (L. F.) | 1887 Van Slyck, Geo. W. (L. F.) |
| 1887 Townsend, Howard. | 1887 Verastigui, Alberto.
Havana, Cuba. |
| 1888 Thompson, W. Gilman, M.D. | |
| 1888 Twombly, Horatio N. | 1887 Voorhees, Philip R. |
| 1888 Tompkins, Wm. W. | 1888 Villard, Henry. |
| 1888 Tresidder, John R. | 1888 Ver Planck, Wm. G. |
| 1888 Taylor, C. Fayette, M.D. | 1888 Vail, Theodore N. |
| 1889 Taylor, Franklin E. | 1889 Vanderbilt, Geo. W. (L. F.) |
| 1889 Tuckerman, Joseph, Newport,
R. I. | 1889 Van Devanter, Willis,
Cheyenne, Wyoming. |
| 1889 Topping, Henry S. | |
| 1889 Tefft, E. Griswold. | 1854 Webb, William H. |
| 1889 Townsend, Alfred M. | 1866 Wendell, Jacob, (L. F.) |
| 1889 Tuck, Somerville P. | 1868 White, Alexander M. |
| 1889 Thompson, Rob't M. | 1870 Webster, Sidney. |
| 1889 Tatham, Chas. | 1870 Wilson, Gen. Jas. Grant. (L. F.) |
| 1889 Thaw, Wm., Jr., Allegheny, Pa. | 1870 Wright, E. Kellogg. |
| 1889 Throop, Enos T. | 1870 Ward, T. W. |
| 1889 Trask, Chas. H. | 1872 Wetmore, Wm. Boerum. (L. F.) |
| | 1872 Wells, Jacob. |
| 1884 Utter, Dr. Francis A. | 1873 Wiener, Joseph, M. D. (L. F.) |
| 1888 Uhl, Edward. (L. F.) | 1874 Weyman, Charles S. |

- 1874 Wheeler, Everett P.
 1874 Wetmore, Hon. George P. (L. F.)
 1874 Walraven, Ira E., Philadelphia, Pa.
 1875 Work, J. Henry.
 1875 White, Charles Trumbull.
 1875 Wilcox, Franklin A.
 1875 White, David,
 Ft. Montgomery, N. Y.
 1875 Winslow, Gen. Edward F.
 1875 Whitehead, Comdr. Wm., U.S.N.
 1875 White, Loomis L.
 1876 Wedemeyer, A. J. D.
 1877 Ward, W. S., Denver, Colo.
 1877 Waters, James T.
 1877 Woodruff, Col. D., U. S. A.
 1878 Whitehead, Henry M.
 1878 Whittemore, Charles.
 1879 Watson, Francis A. (L. F.)
 1879 Williams, Richard P.
 1880 Wilson, James.
 1881 Wilson, John.
 1882 Wadsworth, John H.
 1882 Waddingham, Wilson. (L. F.)
 1882 Williams, David. (L. F.)
 1882 Winthrop, Robert. (L. F.)
 1883 Wilson, Theodore.
 1884 Wheelwright, Wm. D.
 1884 Watson, George H. (L. F.)
 1884 Wood, Wm. H. S.
 1884 Walcott, Joseph C.
 1886 Wright, Wm. Phillips.
 1886 Walsh, Richard M. L.
 1886 White, S. V. (L. F.)
 1886 Wiman, Erastus.
 1886 Walker, John A.
 1886 Willetts, Edward B.
 1886 Whitehouse, J. H.
 1886 White, Horace.
 1886 Wales, Salem H.
 1886 Watson, Wm. P.
 1886 Ward, John E.
 1887 White, Julian Leroy. (L. F.)
 1887 White, William Aug.
 1887 White, Alfred T.
 1887 Wilson, J. Wall.
 1887 Wheelock, George G., M.D.
 1887 White, Andrew J.
 1887 White, Henry, London, Eng.
 1887 Whitely, James.
 1887 Wilcox, Stephen.
 1887 Wisner, William H.
 1887 Westcott, Clarence L.
 1887 Welling, W. Brenton.
 1888 West, Hon. George,
 Ballston Spa., N. Y.
 1888 Whitehouse, W. Fitzhugh.
 1888 Wynkoop, Francis S.
 1888 Walsh, F. J.
 1888 Witherbee, Frank S.
 1888 Wynkoop, G. H., M.D.
 1888 West, Frederick T.
 1888 Woodward, Jas. T. (L. F.)
 1888 Wendell, Ten Eyck.
 1888 Worthington, Robt. H.
 1888 Wolfe, S. B., M.D.
 1888 Wetmore, Edmund.
 1888 Winslow, Daniel.
 1889 Warner, Lucien C.
 1889 Wilkinson, Robt. F.
 1889 Wood, Wallace.
 1889 Wilkin, Chas. H., M.D.
 1889 Weber, Christian.
 1889 Warfield, Ethelbert D., Oxford, O.
 1889 Webster, Harrison E.,
 Schenectady, N. Y.
 1889 Waterbury, John I.
 1889 Whitehouse, Geo. M.
 1874 Young, Mason.
 1888 Young, Edward F. C.,
 Jersey City, N. J.
 1889 Young, Jesse.
 1875 Zollikoffer, Oscar.
 1884 Zabriskie, Andrew C. (L. F.)
 1886 Zucker, Alfred.

FELLOWS DECEASED, 1889.

H. V. Allien, Aug. 13.
Rush E. Avery, Dec. 17.
Thos. Ashwell, Oct. 14.
N. M. Beckwith, Sept. 23.
S. L. M. Barlow, July 10.
William Calhoun, Oct. 21.
Jacob H. V. Cockcroft, Feby. 4.
John Crerar, Oct. 19.
John G. Davis, April 13.
E. N. Dickerson, Dec. 12.
S. Lowell Elliot, Feby. 12.
Hon. Hugo Fritsch, Jany. 27.
John W. Hamersley, June 7.
Alexander Hamilton, Dec. 30.
Hector C. Havemeyer, Dec. 14.

Henry Herrman, Feby. 14.
James B. Hunter, M.D., June 10.
Gerhard Janssen, Sept. 19.
Harvey Kennedy, Dec. 9.
Herman R. LeRoy, April 8.
Robert E. Livingston, Jany. 20.
Joseph A. Monheimer, Mch. 4.
Henderson Moore, Feby. 27.
Alexander B. Mott, M.D., Aug. 12.
H. G. Pearson, April 20.
George H. Purser, June 21.
A. Thorndike Rice, May 16.
G. H. Witthaus, May 30.
Charles B. Wood, May 13.

List of Foreign and Domestic Geographical and other Scientific Bodies with which this Society is in Communication and Constant Exchange of Publications.

ALASKA :

Alaskan Society of Natural history and Ethnology, Sitka.

ARGENTINE REPUBLIC :

Academia Nacional de Ciencias, Córdoba.

Instituto Geográfico Argentino, Buenos-Aires.

Sociedad Geográfica Argentina, Buenos-Aires.

AUSTRALIA :

Department of Mines, Sydney, N. S. W.

Linnean Society of New South Wales, Sydney, N. S. W.

Royal Society of New South Wales, Sydney, N. S. W.

Royal Society of Queensland, Brisbane, Queensland.

Melbourne Observatory, Melbourne, Victoria.

Royal Society of Victoria, Melbourne, Victoria.

Public Library, Museum, and National Gallery, Melbourne.

AUSTRIA :

Ferdinandeum, Innsbruck.

Gesellschaft der Wissenschaften, Prague.

Akademie der Wissenschaften, Krakau.

K. K. Akademie der Wissenschaften, Vienna.

K. K. Geographische Gesellschaft, Vienna.

K. K. Geolog. Reichsanstalt, Vienna.

K. K. Naturhist. Hofmuseum, Vienna.

K. K. Militär-Geographisches Institut, Vienna.

BELGIUM :

Société Belge de Géographie, Antwerp.

Académie Royale de Belgique, Brussels.

Institut National de Géographie, Brussels.

Le Mouvement Géographique, Brussels.

Société Royale Belge de Géographie, Brussels.

BRAZIL :

Bibliotheca Nacional, Rio de Janeiro.

Instituto Historico, Geographico, e Ethnographico do Brazil, Rio de Janeiro.

Musen Nacional, Rio de Janeiro.

Observatorio, Rio de Janeiro.

Secção da Sociedade de Geographia de Lisboa no Brazil, Rio de Janeiro.

Sociedade de Geographia, Rio de Janeiro.

CALIFORNIA :

California Academy of Sciences, San Francisco.
Geographical Society of the Pacific, San Francisco.
Mercantile Library Association, San Francisco.
California Historical Society, Berkeley.
University of California, Berkeley.

CANADA :

Hamilton Association, Hamilton, Ontario.
Geological and Natural History Survey of Canada, Ottawa.
Royal Society of Canada, Ottawa.
Geographical Society, Quebec.
Literary and Historical Society, Quebec.
Canadian Institute, Toronto.

CHILI :

Der Deutsche Wissenschaftliche Verein, Santiago.
Observatorio Astronómico, Santiago.
Oficina Central de Estadística, Santiago.

CHINA :

China Branch of the Royal Asiatic Society, Shanghai.
Statistical Department, Inspectorate-General Imp. Maritime Customs,
Shanghai.

CONNECTICUT :

Connecticut Academy of Arts and Sciences, New Haven.
Library of Yale University, New Haven.
Ferguson Library, Stamford.

DENMARK :

Royal Danish Academy of Sciences, Copenhagen.
Royal Danish Geographical Society, Copenhagen.
Society of Northern Antiquaries, Copenhagen.

DISTRICT OF COLUMBIA :

Philosophical Society, Washington.
Smithsonian Institution, Washington.

EGYPT :

Société Khédiviale de Géographie, Cairo.

ENGLAND :

Royal Cornwall Polytechnic Society, Falmouth.
Literary and Philosophical Society, Liverpool.
Royal Asiatic Society, London.
Royal Geographical Society, London.
Royal Society, London.
Meteorological Office, London.
Statistical Society, London.
Victoria Institute, London.
Literary and Philosophical Society, Manchester.

Manchester Geographical Society, Manchester.
Statistical Society, Manchester.
Royal Geological Society, Penzance.
Yorkshire Philosophical Society, York.

FRANCE :

Société Académique de Maine-et-Loire, Angers.
Société de Géographie Commerciale, Bordeaux.
Société des Sciences Naturelles, Cherbourg.
Union Géographique du Nord de la France, Douai.
Société de Géographie Commerciale, Havre.
Société de Géographie, Lille.
Société de Géographie, Lyons.
Société de Géographie, Marseilles.
Société Languedocienne de Géographie, Montpellier.
Société de Géographie, Paris.
Société de Géographie Commerciale, Paris.
La Géographie, Paris.
Le Galilée, Paris.
Société de Topographie, Paris.
Société de Géographie, Rochefort.
Société Normande de Géographie, Rouen.
Société de Géographie, Saint-Nazaire.
Société Académique Franco-Hispano-Portugaise, Toulouse.
Société de Géographie, Toulouse.
Société de Géographie, Tours.
Société Polymathique du Morbihan, Vannes.

GERMANY :

Deutscher Kolonialverein, Berlin.
Gesellschaft für allgem. Erdkunde, Berlin.
Gesellschaft für Erdkunde, Berlin.
Geographische Gesellschaft, Bremen.
Geographische Gesellschaft, Carlsruhe.
Verein für Erdkunde, Darmstadt.
Verein für Erdkunde, Dresden.
Naturforschende Gesellschaft, Emden.
Physikal. Verein, Frankfurt-a-M.
Verein für Geog. und Statistik, Frankfurt-a-M.
Naturforschende Gesellschaft, Görlitz.
K. Gesellschaft der Wissenschaften, Göttingen.
Geographische Gesellschaft, Greifswald.
Verein für Erdkunde, Halle-a-S.
Geographische Gesellschaft, Hamburg.
Geographische Gesellschaft, Hanover.
Geographische Gesellschaft, Jena.
Naturwiss. Verein für Schleswig-Holstein, Kiel.

K. Gesellschaft der Wissenschaften, Leipzig.
 Verein für Erdkunde, Leipzig.
 Geographische Gesellschaft, Lübeck.
 Verein für Erdkunde, Metz.
 Akademie der Wissenschaften, Munich.
 Geographische Gesellschaft, Munich.
 Verein für Handelsgeographie, Stuttgart.
 Verein für Vaterländ. Naturkunde, Stuttgart.
 Verein für Naturkunde, Wiesbaden.

HUNGARY :

Gewerbeschule, Bistritz.
 Hungarian Academy of Sciences, Buda-Pest.
 Hungarian Geog. Society, Buda-Pest.
 Royal Hungarian University, Buda-Pest.
 Verein für Siebenbürg. Landeskunde, Hermannstadt.

INDIANA :

Brookville Society of Natural History, Brookville.

IOWA :

Academy of Natural Sciences, Davenport.
 Historical Society, Iowa City.

IRELAND :

Natural History and Philosophical Society, Belfast.
 Royal Dublin Society, Dublin.

ITALY :

Sez. Fiorentina della Società Africana, Florence.
 R. Biblioteca Naz. Centrale, Florence.
 Società d'Esplorazione Commerciale, Milan.
 Società Africana d'Italia, Naples.
 Biblioteca Nazionale Centrale Vittorio Emanuele, Rome.
 Società Geografica Italiana, Rome.
 British and American Archæological Society, Rome.

JAPAN :

Asiatic Society, Yokohama.
 Geographical Society, Tokyo.
 Imperial University of Japan, Tokyo.
 Seismological Society, Tokyo.

JAVA :

Bataviaasch Genootschap van Kunsten en Wetenschappen, Batavia.

MARYLAND :

Naval Institute, Annapolis.

MASSACHUSETTS :

Appalachian Mountain Club, Boston.
 Boston Society of Natural Sciences, Boston.
 Peabody Museum, Cambridge.
 State Library, Boston.

Library of Harvard University, Cambridge.
Massachusetts Historical Society, Boston.
Public Library, Boston.
American Association for the Advancement of Science, Salem.
Essex Institute, Salem.
Atlantic Monthly, Boston.
Peabody Academy of Science, Salem.
American Antiquarian Society, Worcester.
Society of Antiquity, Worcester.

MEXICO :

Museo Nacional, Mexico.
Observatorio Meteorol. Magn. Central, Mexico.
Sociedad Mexicana de Geografía y Estadística, Mexico.
Sociedad Científica " Antonio Alzate," Mexico.

MICHIGAN :

Public Library, Detroit.

MINNESOTA :

Academy of Natural Sciences, Minneapolis.
Minnesota Historical Society, St. Paul.

MISSOURI :

Academy of Sciences, St. Louis.

NEBRASKA :

State Historical Society, Lincoln.

NETHERLANDS :

Aardrijks. Genootschap, Amsterdam.
K. Instituut voor de Taal- L- en V-van Nederlandsch-Indië, The Hague.
Nederlandsch Meteor. Instituut, Utrecht.

NEW YORK :

State Museum of Natural History, Albany.
Long Island Historical Society, Brooklyn.
Society of Natural Sciences, Buffalo.
Academy of Sciences, New York.
New York Historical Society, New York.
New York Linnean Society, New York.
Vassar Brothers Institute, Poughkeepsie.
Oneida Historical Society, Utica.
Library of Columbia College, New York.
State Library, Albany.
Am. Museum of Nat. History, New York.
Railroad and Engineering Journal, New York.

NEW ZEALAND :

The New Zealand Institute, Wellington.

NORWAY :

Royal University, Christiania.

OHIO :

- Cincinnati Society of Natural History, Cincinnati.
- Western Reserve and Northern Ohio History Society, Cleveland.

PENNSYLVANIA :

- Academy of Natural Sciences, Philadelphia.
- Second Geological Survey of Pennsylvania, Philadelphia.
- Historical and Geological Society of Wyoming, Wilkesbarre.
- Franklin Institute, Philadelphia.

PORTUGAL :

- Academia Real das Sciencias, Lisbon.
- Commissão Central Permanente de Geographia, Lisbon.
- Sociedade de Geographia, Lisbon.

ROUMANIA :

- Societatea Geog. Română, Bucharest.

RUSSIA :

- Société des Naturalistes de la Nouvelle Russie, Odessa.
- Société des Naturalistes, Kief.
- Imperial Russian Geographical Society, St. Petersburg.
- Société de l'Histoire Naturelle, Kazan.
- Caucasian Section of the Imp. Russ. Geog. Society, Tiflis.

SCOTLAND :

- Geological Society, Edinburgh.
- Royal Society, Edinburgh.
- Scottish Geographical Society, Edinburgh.
- Philosophical Society, Glasgow.

SPAIN :

- Sociedad Española de Geografía Comercial, Madrid.
- Sociedad Geográfica, Madrid.

SWEDEN :

- Society for Anthropology and Geography, Stockholm.
- Société Royal des Sciences, Upsal.
- University of Lund, Lund.

SWITZERLAND :

- Hist. und Antiq. Gesellschaft, Basle.
- Geographische Gesellschaft, Berne.
- Société de Géographie, Geneva.
- Geog. Comm. Gesellschaft, St. Gall.
- Antiquarische Gesellschaft, Zurich.

TENNESSEE :

- State Board of Health, Nashville.

WISCONSIN :

- State Historical Society, Madison.

ADDITIONS TO THE LIBRARY AND MAP-ROOM.

PURCHASES.

The Voyage of François Pyrard of Laval, vol. ii., pt. 1, (Hakluyt Society), London, 1888; Colección de Documentos Inéditos relativos al Descubrimiento, Conquista y Organización de las antiguas posesiones españolas de América y Oceanía, etc., Tomos 1-42, Madrid, 1864-1884; La Géographie Médicale, par A. Bordier, Paris, 1884; Eöthen, or Traces of Travel brought home from the East, by A. W. Kinglake, New York, 1850; The Abode of Snow, by Andrew Wilson, New York and London, 1886; Social Life in Egypt, by Stanley Lane-Poole, New York, n. d.; Report of the Krakatoa Committee of the Royal Society, London, 1888; The Naturalist in Nicaragua, by Thos. Belt, 2d Ed., London, 1888; Stanford's Compendium of Geography—Europe—London, 1885; The Harvest of the Sea, by Jas. G. Bertram, New York, 1886; The Land we Live In: Sketch-Book of the British Empire, 4 vols. in 2, London, n. d.; Historia de Méjico desde los primeros movimientos que prepararon su independencia en el año de 1808 hasta la época presente, por Lucas Alaman, 5 tomos, Méjico, 1849-1852; Disertaciones sobre la Historia de la República Mexicana, por Lucas Alaman, 3 tomos, Méjico, 1844-1849; Defensa del Ex-Ministro de Relaciones, etc., Lucas Alaman, Méjico, 1834; Nouveau Dictionnaire de Géographie Universelle, par Vivien de Saint-Martin, 3 vols. 4°, Paris, 1879-1887; Chronica do Serenissimo Senhor Rei D. Manoel, por Damião de Goes, Lisboa, 1749; Peregrinaciones de Fernan Mendez Pinto traduccion de Herrera Maldonado, Madrid, 1620; España Geográfica, Histórica, etc., por Francisco de Paula Mellado, Madrid, 1845; Al-Makkari's Mohammedan Dynasties in Spain, translated by Pascual de Gayangos, 2 vols., London, 1840-1843; Our Kin Across the Sea, by J. C. Firth, London, 1888; A Ramble in British Columbia, by J. A. Lees and W. J. Clutterbuck, London, 1888; Historic Towns, the Cinque Ports, by Montagu Burrows, London, 1888; Elementary Theory of the Tides, by T. K. Abbott, London, 1888; Great Circle Sailing, by Richard A. Proctor, London and New York, 1888; Struggles through Life: Travels in Europe, etc., by John Harriott, 2 vols., London 1807; The History of Lapland: with Rudbeck's

Travels, London, 1704; Newton's Principia: and System of the World, tr. by Andrew Motte, New York, 1846; Murray's Hand-Books: Kent and Sussex, Surrey, Hampshire, Isle of Wight, Westmoreland, Cumberland and the Lakes, Shropshire, Cheshire and Lancashire, Berks, Bucks and Oxfordshire, Essex, Suffolk, Norfolk, Cambridgeshire, Devon and Cornwall, Durham and Northumberland, Wiltshire, Dorsetshire, Somersetshire, Gloucestershire, Worcestershire, Herefordshire, 10 vols., London, 1863-1872; Geographisches Jahrbuch, 1888, Götha, 1888; Nouvelle Géographie Universelle, par Elisée Reclus, L'Océan et Terres Océaniques, Paris, 1889; Appleton's Cyclopædia of American Biography, 6 vols., New York, 1888-1889; Travels in Portugal in 1789 and 1790, by James Murphy, London, 1795; The American Universal Geography, by Jedidiah Morse, 2 vols., Boston, 1793; Memoirs of the Anthropological Society, 3 vols., London, 1865-1870; Annals of Rural Bengal, by W. W. Hunter, New York, 1868; Orissa, by W. W. Hunter, 2 vols., London, 1872; Bibliographer's Manual of English Literature, by Wm. Thos. Lowndes, 6 vols., London, 1869; Pilgrimage of Arculfus in the Holy Land (Palestine Pil. Text. Soc.), London, 1889; The Shrine of Saft-El-Henneh and the Land of Goshen, by Edouard Naville (Egypt Expl. Fund), London, 1888; Pilgrimage of Joannes Phocas (Pal. Pil. Text. Soc.), London, 1889; Russia under the Tzars, by Stepniak, New York, 1885; History of the City of New York, by Mary L. Booth, New York, 1880; Store City of Pithom, 3d Ed. (Egypt Expl. Fund), by E. Naville, London, 1888; Naukratis, Pt. 1, 2d Ed. (Egypt Expl. Fund), by W. M. Flinders Petrie, London, 1888; Harper's Latin Dictionary, by Charlton T. Lewis and Charles Short, New York and Oxford, 1880; Eastern Persia, by F. J. Goldsmid, 2 vols., London, 1876; Kabinet van Nederlandsche Outheden en Gezichten, 6 vols., Amsterdam, 1725-1733; L'Ambassade de la Compagnie Orientale des Provinces Unies, etc., par Jean Nieuhoff, Leyde, 1665; Voyage en Orient, par A. de Lamartine, 2 vols., Bruxelles, 1838; Gazetteer of the State of New York, by T. F. Gordon, Philadelphia, 1836; The Student's Atlas in 12 Circular Maps, by R. A. Proctor, London, 1889; Hand-Book for Travellers in Spain, by R. Ford, 2 vols., London, 1845; A Ride in Egypt, by W. J. Loftie, London, 1886; Teneriffe: an Astronomer's Experiment, by C. Piazzzi Smyth, London, 1858; De Geographia

Liber Unus: H. Glareanus, Friburgi, 1530; *Hernandia: Triumphos de la Fé y Gloria*, etc., por F. Ruiz de Leon, Madrid, 1755; *In the Ardennes*, by Katharine S. Macquoid, London, 1881; *Historical Sketch of the Native States of India*, by G. B. Malleson, London, 1875; *History of the French in India*, by G. B. Malleson, London, 1868; *Telegraph and Travel*, by F. J. Goldsmid, London, 1874; *British Cyprus*, by W. Hepworth Dixon, London, 1879; *Glimpses of Greek Life and Scenery*, by Agnes Smith, London, 1884; *Die Culturländer des Alten America*, Band 3, Theil 2, by A. Bastian, Berlin, 1889; *Atlas de la Méditerranée*, par Michelot et Bremond, Paris, 1718-1726; *Nieuwe Zak-Atlas*, Amsterdam, 1739; *Atlas Chorographique, Hist. et portatif des Elections*, Paris, 1763; *Physical Geography*, 3d Ed., by D. T. Ansted, Philadelphia, 1869; *Tour in South Africa*, by J. J. Freeman, London, 1851; *South Australia, Its History*, etc., by Wm. Harcus, Adelaide, 1876; *A Glance at Australia in 1880*, by H. Mortimer Franklyn, Melbourne, 1881; *The Climate of New South Wales*, by H. C. Russell, Sydney, 1877; *Industries of New South Wales*, by Charles Lyne, Sydney, 1882; *Ten Thousand Things Relating to China*, by William B. Langdon, London, 1843; *The Head-Hunters of Borneo*, by Carl Bock, London, 1881; *A Budget of Letters from Japan*, by Arthur Collins Maclay, New York, 1889; *American and English Catalogue*, for 1888, New York and London, 1889; *English Wayfaring Life in the Middle Ages*, by J. J. Jusserand, New York and London, 1889; *The Last Voyage*, 1887, by Annie Brassey, London and New York, 1889; *Through the Heart of Asia: Over the Pamir to India*, by Gabriel Bouvalot, 2 vols., London and New York, 1889; *Appleton's Physical Geography*, by J. D. Quackenbos and others, New York, 1887; *Ragionamenti sopra le cose vedute*, per Francesco Carletti, Firenze, 1701; *Gesta et Vestigia Danorum extra Daniam*: Ericus Pontoppidanus, Lipsiæ et Hafniæ, 1740-41; *Saggio Apologetico degli Storici e Conquistatori per Mariano Llorente*, Parma, 1804; *Elogio d'Amerigo Vespucci*, 2da Ed., per Stanislao Canovai, Cortona, 1789; *Diario da Navegação de P. Lopez de Souza*, por F. A. de Varnhagen, Rio de Janeiro, 1867; *Dissertazione intorno ecc. di N. ed A. Zeni*, per Placido Zurla, Venezia, 1808; *Indicador Cordobes*, por Luis Maria Ramirez, Córdoba, 1837; *Travels in England in the Reign of Elizabeth*, by Paul Hentzner, London, 1797; *Annual*

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Opere Moderne Straniere, Indice, vol. iii, Nos. 5, 6, vol. iv, Nos. 1-3, and Index to III, Statistica di Importazione e di Esportazione, 11 numbers ; Legislazione e Statistica Doganale, 7 numbers ; Debiti Comm., Annali di Statistica, 6 numbers ; Società di Mutuo Soccorso, Infermi negli Ospedali, Bilanci Comunali, Impiegati e Pensionati, 1886-1887 ; Emigrazione, 1888 ; Banche Popolari, Condizioni di Roma, 1888 ; Istruzione Elementare, 1885-86 ; Istruzione Secondaria, 1886-87 ; Opere Pie, Toscana, 1880 ; Sicilia e Sardegna, Statistica Giudiziaria Civile e Commerciale, 1887 ; Statistica Giudiziaria Penale, 1887.

From the Government of Costa Rica :

La Gaceta, Tom. 1, No. 52 ; Boletín del Instituto Meteorológico Nacional, No. 4 ; San José.

From the Imperial Academy of Sciences, St. Petersburg :

Bulletin, Bd. XXXII, Nos. 1-4, Stern-Ephemeriden, 1889 ; St. Petersburg.

From the California Academy of Sciences, San Francisco :

Proceedings, Second Series, vol. i, pts. 1-2, San Francisco.

From the Inspectorate-General, Imp. Maritime Customs, Shanghai :

Chinese Lighthouses, 1889, Returns of Trade, Parts 1 and 2, 1888, Shanghai.

From the Swedish Government :

Official Publications giving Statistics of Commerce, Forests, Railroads, Banks, Spirit-Manufacture, Iron and Steel, etc.: 1 num-

ber for 1883-84, 17 numbers for 1887, 26 for 1888, 19 for 1889, Stockholm.

From the Bulgarian Government :

Statistique du Commerce de la Principauté, 1885, 1886, 1887, Mouvement de la Population pendant l'Année 1881, Sophia.

From the Government of Wurtemberg :

Statistisch ; Landesamt Württemberg ; Vierteljahrshefte, Jahrgang XI, Heft 1-4, Stuttgart.

From the Department of Mines, Sydney, N. S. W.:

The New South Wales Mineral Court at the Melbourne Exhibition, 1888, Sydney.

From the Nederlandsch Meteorolog. Instituut, Utrecht.

Jaarboek, Utrecht, 1888 ; Verdeeling der Warmte over de Aarde door C. H. D. Buys Ballot, Amsterdam, 1888.

From the Imperial Academy of Sciences, Vienna :

Philosoph.-Histor. Classe, Band 36, Mathemat.-Naturwissenschaft ; Classe, Band 53 ; Sitzungsberichte, Philo.-Hist., Band 114 Heft 2, Band 115, 116, Math.-Nat., Band 95, Band 96, Band 97, Almanach, 1887, 1888, Denkschriften, Band 54 ; Wien.

From the Imp.-Royal Geological Institute, Vienna :

Jahrbuch, Band 38, Heft 3, 4, Band 39. Heft 1, 2 ; Verhandlungen, Nr. 15-18, 1888 ; Nr. 1-12, 1889 ; Wien.

From the University of Vienna :

Bericht, XIV. Jahr., 1887-1888 ; Wien.

From the Military-Geographical Institute, Vienna :

Mittheilungen, Band 8, Wien.

From the Post Office Department, Washington :

Post Route Maps, in sheets, 67 in all, for August, 1889 ; Washington.

From the Hydrographic Office, Washington :

Pilot Charts of the North Atlantic Ocean, Jan.-Dec., 1889, and 2 Supplementary Charts ; Charts : S. Coast of Newfoundland, Burgeo Islands to Cape St. Mary ; S. Nova Scotia, Port Mouton and Liverpool Bay ; New Brunswick, Shediac Bay and Harbor ; S. Coast of Quebec, Washtawooka to Cape Mackinnon ; Nova Scotia, Country Harbor ; Newfoundland, St. Johns Harbor ; W. and S. Coasts of Newfoundland, from Bonne Bay to Burgeo Islands ; Easter Island ; W. Coast of Lower California, Playa Maria Bay to

Rosalia Point ; S. Atlantic Ocean, sheet 2 ; Chili, Valparaiso Bay ; S. Atlantic Ocean, Lower Part, sheets 1 and 2 ; Ecuador, Salango Island Anchorage ; Great Circle Sailing Chart, N. Pacific Ocean ; Island of Antigua ; Ecuador, Caraguez River ; Ecuador, Santa Elena Bay ; Gulf Coast of the U. S., Key West to Mississippi River ; Ecuador, Manta Bay ; Saint Anne Harbor and Great Bras d'Or ; Ship Harbor and Anchorages ; Nova Scotia, Whitehaven ; Great Circle Sailing Chart of Indian Ocean ; Nova Scotia, Nicomtau Bay ; Gulf of St. Lawrence, Caribou Harbor ; S. Coast of Oahu, Pearl River and Lochs ; Eastern Archipelago, Sunda Strait and Approaches ; Chili, Port Patillos and Patache Cove ; Chili, Algorrobo Harbor ; Peru, Salinas y Chica Bay ; Chili, Chabanaya Road and Pabellon de Pico Cove ; S. Atlantic Ocean, sheet 1 ; Chili, Iquique Road ; W. Coast of Newfoundland and S. Coast of Quebec ; Great Circle Sailing Chart of S. Pacific Ocean ; Chili, Antofagasta Road ; Gulf of St. Lawrence, Anticosti Island to Point de Monts ; Lower California, San Diego to San Quentin Bay ; Chili, Megillones del N. and Buena Coves ; Gulf of St. Lawrence, Nova Scotia, Wallace Harbor ; West Indies, Santa Lucia, Vieux Fort Bay ; Peru, Port Chilca ; Bahama Bank, Great Stirrup Cay, Berry Islands ; Gulf of St. Lawrence, Nova Scotia, Pomquet and Tracadie Harbors ; Anticosti Island and adjacent Coast of Quebec ; Prince Edward Island, Murray Harbor ; Anchorages, Coast of Ecuador and Peru ; Approaches to Demerara and Essequibo Rivers ; Coast of Nicaragua, Brito Harbor ; Chili, Guanillo del Norte Cove ; Peru, Port Chimbote ; West Indies, St. Vincent, Kingston, Great Head and Calliaqua Bays ; River St. Lawrence, Point de Monts to River Saguenay ; Gulf Coast of the U. S., Mississippi River to the Rio Grande ; Ceará Bay ; Harbors and Anchorages in the Hawaiian Islands ; Gaspé Harbor ; River Saguenay to Quebec ; Santo Domingo, Port Santa Barbara ; Anchorages on the Coast of Peru ; Coast of Peru, Huacho Bay and Chancay Bay ; South America, Mouths of the Demerara and Essequibo Rivers ; Chili, Ports Caldera and Calderilla ; W. Coast of Newfoundland, Port Saunders and Keppel and Hawke Harbors.

From the War Department, Washington :

Report of Chief of Engineers for 1888, vols. 1-4, Washington ; Series of War Maps, 28 sheets, 1865-1883.

lxiv *Additions to Library and Map-Room.*

From the Department of Agriculture, Washington :

Album of Statistics, 1889.

From the Director of the Mint :

Production of Gold and Silver in 1887 ; Reports of the Director, 1888, 1889 ; Production of the Precious Metals in 1888, Washington.

From the Department of State, Washington :

Commercial Relations of the U. S. in 1885-1886, 2 vols. ; Message Relating to Samoa, Dec. 21, 1888 ; Reports of Consuls, 97-109 ; Trade of Great Britain with the United States (Report January, 1791) ; Foreign Relations, 1872, Part 2, vols. 1-5, 1873, Parts 1-3, 1874 and 1878 ; International Sanitary Conference, 1881 ; Paris Exposition, 1878, vols. 1-5 ; Commercial Relations for 1872, 1874, 1876, 1877, 1882 and 1883 (2 vols.) ; Papers Relating to the Treaty of Washington, vol. 6 ; Case of the United States at Geneva, 1872 ; Digest of Opinions and Leading Cases on International Law ; The War in South America, 1880-1881 ; Trade and Transportation in Spanish America, Washington.

From the Department of Justice, Washington :

Report of the Attorney-General for 1888, Washington.

From the Department of the Interior, Washington :

Education in Alaska ; Geological Survey, 7th Annual Report (1885-86) ; Quicksilver Deposits of the Pacific Slope (Becker) and Atlas ; Monograph XIV, Fossil Fishes and Plants (Newberry) ; Official Register of the United States, 1887-88, 2 vols. ; Topographical Map of the United States, by the U. S. Geological Survey, Atlas Sheets, 45 in all ; Circulars of the Bureau of Education, 2 ; Publications of the Smithsonian Institution ; Report for 1886-87, Additions and Corrections to List of Foreign Correspondents ; Report on International Exchanges.

From the U. S. Fish Commission, Washington :

Fisheries and Fishing Industries of the U. S., sections 2, 3 and 4, 5, vols. 1 and 2, and Vol. Plates, Report for 1886, Part XIV ; Fur Seal and Otter Fisheries of Alaska.

From the U. S. Coast and Geodetic Survey, Washington :

Bulletins 5-13, Methods, etc., in Calculating Fluctuations in the Level of Lake Champlain ; Report for 1887.

From the U. S. Naval Observatory, Washington :

Yarnall's Catalogue of the Stars, 3d Ed., by Prof. E. Frisby, U. S. N.

From the Navy Department, Washington :

Perry's Japan Expedition, vol. 3 ; Series of Information from Abroad, No. 8 ; Naval Mobilization.

From the Office of the Library and War Records :

Exhibit of the Navy Department at the Centennial Exposition of the Ohio Valley, July-October, 1888 ; Proceedings U. S. Naval Institute, vol. xiv, No. 4, and vol. xv, Nos. 1, 2 ; Information from Abroad, No. 8 ; Report on European Dockyards, by Hichborn (2 copies) ; Intelligence Report on the Panama Canal, by Rogers.

Volumes bound during the year :

Colectión de Documentos Inéditos relativos al Descubrimiento, Conquista y Organización de las Antiguas Posesiones Españolas de América y Oceanía, etc., vols. 1-42 (2 vols. in 1)—Appalachia, vols. 1-4—Le Tour du Monde, vols. 39-56—Dictionnaire de Géographie Universelle (Vivien de Saint Martin), vols. 1-3—Congrès International des Américanistes (1875, 1877, 1881, 1883), 7 vols.—Congrès International des Sciences Géographiques (1871-1875, 1881), 6 vols.—Revue de Géographie, vols. 16-23—Comptes Rendus des Séances de la Société de Géographie (Paris), 1882-1887, 6 vols.—Bulletin de la Société de Géographie (Paris), 7^{me} Série, Tomes 4-8, 1883-1887—Annales de l'Extrême Orient, 1883, 1888, vols. 6-10—Geografisk Tidskrift (Copenhagen), 1877-1886, vols. 1-8 (2 vols in 1)—Bulletin de la Société de Géographie Commerciale de Paris, 1883-1887, vols. 6-9—Revue de la Société de Géographie (Tours), vol. 1-4 (2 vols. in 1)—Bulletin de la Société Royale Belge de Géographie (Brussels), 1877-1887, vols. 1-11—Bulletin de la Société Royale de Géographie (Antwerp), 1877-1887, vols. 1-12—Revue Coloniale Internationale (Amsterdam), 1885-1887, 5 vols.—Bulletin de la Société de Géographie (Lille), vols. 2, 4, 8—Revue Française (Paris), 1888, vols. 7-8—Bulletin de la Société de Géographie Commerciale (Havre), 1884-1888 (2 vols. in 1)—Bulletin de la Société de Géographie (Rochefort), 1881-1888, vols. 3-9—Bulletin de l'Union Géographique du Nord de la France (Douai), vols. 1, 2, 4, 5, 7, 8—Bulletin de la Société de Géographie

(Toulouse), vols. 1, 3, 4, 7—Bulletin de la Société de Géographie (Marseilles), 1877-1887, vols. 1-11—Bulletin de la Société de Géographie (Lyons), 1875-1887, vols. 1-6—Bulletin de la Société de Géographie Commerciale (Bordeaux), 1874-1886, (bound in 5 vols.)—Bulletin de la Société Languedocienne de Géographie (Montpellier), 1878-1887, vols. 1-10—Bulletin de la Société Normande de Géographie (Rouen), 1879-1886, vols. 1-8—Mittheilungen der Afrikanischen Gessellschaft in Deutschland (Berlin), 1878-1887, vols. 1-5 (in 2 vols.)—Correspondenzblatt der Afrikanischen Gesellschaft (Berlin), 1873-1878, vols. 1-2 (bound in one)—Zeitschrift der Allgemeine Erdkunde (Berlin) Neue Folge, 1856-1865, vols. 1-18—Verhandlungen der Gesellschaft für Erdkunde (Berlin), 1874-1887, vols. 1-14—Zeitschrift der Gesellschaft für Erdkunde (Berlin), 1873-1887, vols. 8-22—Mittheilungen der K.-K.-Geographischen Gesellschaft (Vienna), vols. 1-3, 5-10: Neue Folge, 1868-1872, vols. 1-5, 1876-1879, vols. 9-12, 1882-1887, vols. 15-20—Zeitschrift der Wissenschaftliche Geographie (Lahr and Wien), 1880-1883, vols. 1-4 (2 vols. in 1)—Mittheilungen des K.-K.-Militär-Geographischen Institutes (Vienna), 1881-1887, vols. 1-7—Geographisches Jahrbuch (Gotha), 1880-1888, vols. 8-12—Proceedings of the Royal Geographical Society (London), 1885-1888, vols. 7-10—Scottish Geographical Magazine, Edinburgh, 1885-1888, vols. 1-4—Journal of the Manchester Geographical Society, 1885-1886, vols. 1-2—Dr. A. Petermanns Mittheilungen (Gotha), 1885-1888, vols. 31-34; Inhaltsverzeichniss, 1875-1884; Ergänzungsbände 17 and 18—Deutsche Rundschau für Geographie und Statistik, (Vienna), 1878-1888, vols. 1-10—Oesterreichische Monatsschrift für den Orient (Vienna), 1883-84, 1887-88, 2 vols.—Mittheilungen des historischen Vereines für Steiermark (Graz), 1850-1853, 1855-1859, Heft 1-4, 6-9—Buletin Societatie Geografice Române (Bucharest), 1876, 1883-1887, vols. 1, 4-8—Boletin de la Exploradora (Vitoria), 1880-1881, vols. 1 and 2—Pubblicazioni del Circolo Geografico Italiano (Turin), 1868-1874, vols. 1-3—Bullettino della Sezione Fiorentina della Società Africana d'Italia, 1885-1887, vols. 1-3—Bollettino della Società Geografica Italiana, 1870, Fasc. 4-5, 1873, vols. 9 and 10, 1874-5, vols. 11, 12; Serie II, 1876, vol. 1, 1878, vol. 3, 1882-1887, vols. 7-12, Serie III, 1888, vol. 1—Cosmos de Guido Cora (Turin), 1873-1885, vols.

1-8—Boletín de la Sociedad Geográfica (Madrid), 1876-1885, vols. 1-18—Deutsche Kolonialzeitung (Berlin), 1885-1887, vols. 2-4—Jahresbericht der Geographischen Gesellschaft (Munich), 1880-1886, Heft 7-11 (in one volume)—Mittheilungen der Geographischen Gesellschaft (für Thüringen), zu Jena, 1882-1885, vols. 1-3 (in one)—Mittheilungen des Vereins für Erdkunde (Halle $\frac{2}{3}$), 1877-1887 (in two volumes)—Jahresbericht des Württembergischen Vereins für Handelsgeographie (Stuttgart), 1882-1886 (in one volume)—Jahresbericht des Vereins von Freunden der Erdkunde (Leipzig), 1861-1876, 1881-1886 (in five volumes)—Deutsche Geographische Blätter (Bremen), 1877-1888, vols. 1-11 Mittheilungen der Geographischen Gesellschaft (Hamburg), 1876-1886, 6 vols.—Jahresbericht des Vereins für Erdkunde, (Dresden), 1873-1884, Heft 11-21 (in two volumes)—Le Globe : Mémoires de la Société de Géographie (Geneva), 1860, 1867-1869, 1871-1887, vols. 1, 6-8, 10-26 (12 volumes)—Fernschau : Jahrbuch der Mittelschweizerischen Geographisch-Commerciellen Gesellschaft (Aarau) 1886-1888 (2 vols. in 1)—Mittheilungen der Ostschweizerischen Geog.-Commerciellen Gesellschaft (St. Gall), 1883-1886, Heft 1-3 (in one volume)—Jahresbericht der Geographischen Gesellschaft (Berne), 1880-1887, Heft 3-8 (in two volumes)—Jahresbericht des Vereins für Erdkunde (Metz), 1878-1886, Heft 1-9 (in two volumes)—Schriften des Naturwissenschaftlichen Vereins für Schleswig-Holstein (Kiel), 1873-1886, vols. 1-6 (2 vols. in 1).

PART I.

TRANSACTIONS
OF
THE SOCIETY FOR THE YEAR
1889.

TRANSACTIONS OF THE SOCIETY FOR 1889.

Annual Meeting of the American Geographical Society, held at Chickering Hall, Tuesday, January 15, 1889, at 8 o'clock, P. M.

President DALY in the chair.

On motion, duly seconded, it was voted to dispense with the reading of the minutes of the previous meeting.

The following persons were elected Fellows of the Society :

Edmund Horace Hamilton, Richard V. Lewis, William C. Hendrie, William Openhym, Willis Van Devanter, Charles A. Sackett, George Bird Grinnell, William P. O'Connor, Walter Gillies, Chas. P. Huntington, Stephen M. Chester, Franklin E. Taylor, Thurlow Weed Barnes, Prof. Henry W. Haynes, Frank H. Lovell, Henry S. Topping, James H. Benson, Charles J. Gillis, Roland R. Conklin, Joseph Albree, Robert C. Martin, John A. Beyer, C. F. Atkinson, S. L. Abbot, M.D., Thomas Day, A. M. Underhill, Martin Brimmer, John C. Ropes, C. F. A. Hinrichs, Lucien C. Warner, Prof. Angelo Heilprin, Prof. Edward C. Pickering, Clarence W. Barron, John R. De Zeller, Frank D. Hurtt, Prof. J. M. Rice, Thomas Cary Felton, Philip Sherwood Smith, S. H. Kaufmann, Hon. Richard C. McCormick, Francis Blake, Edward Eldridge, A. L. Conger, Dr. Edward G. Gardner, Henry B. Coxe, Rev. Charles Higbee, W. Hastings, Peter Koch, Hon. Wm. D. Harden.

The annual report of the Council was then presented and read :

New York, January 15, 1889. Since the last annual report there have been held six regular meetings of the Society, eight stated and six special meetings of the Council.

At the annual meeting on the 10th of January, 1888, President Daly delivered an address on the "Recent Geographical Work of the World."

On the 15th of February, Prof. William Libbey, Jr., read a paper on "Moscow."

On the 29th of March, the Hon. Clarence Pullen delivered a lecture on the "City of Mexico."

On the 25th of April, Mr. F. S. Dellenbaugh described his observations during a residence in "Finistère: the Artist's Corner of Brittany."

On the 13th of November, Gen. James Harrison Wilson delivered an Address on "China and its Progress."

On the 18th of December, Prof. Wm. H. Brewer, of Yale University, read a paper entitled: "A Contribution to the History of the Great Basin, west of the Rocky Mountains."

All these lectures were illustrated with stereopticon views.

The publication of the Bulletin has proceeded with regularity.

The additions made to the Library and Map Room number 2,389, viz.: Books, 431, Atlases 24, Maps and Charts 229, and Pamphlets, including Serials, 1,705.

The annual report of the Treasurer, Mr. Walter R. T. Jones, shows a balance to the credit of the General Fund of \$1,370.97.

It is with great satisfaction that the Council calls the attention of the Fellows to the unintermitted growth of the Society in numbers and in prosperity, and to the broadening horizon of its usefulness.

WILLIAM REMSEN,
Chairman of Council.

The Nominating Committee then presented the following report:
To the American Geographical Society:

The Nominating Committee, appointed to select officers to fill vacancies—under resolution by the Society, passed at its meeting, December 18, 1888—respectfully report the selection of the following nominees for election, in accordance with Chapter V. Section 2, of the By-Laws:

For President—Chas. P. Daly, LL.D., term to expire January, 1890.

For Vice-President—Gen. Egbert L. Viele, term to expire January, 1892.

For Treasurer—Walter R. T. Jones, term to expire January, 1890.

For Recording Secretary.—Elial F. Hall, term to expire January, 1892.

For Councillors—Chandler Robbins, Levi Holbrook, Prof. Theodore W. Dwight, LL.D., Rev. Philip Schaff, D.D., and Gustav E. Kissel, terms to expire January, 1892.

Rev. C. C. Tiffany, D.D., term to expire January, 1891.

Christian Börs, term to expire January, 1890.

N. P. BAILEY, *Chairman*,
CLINTON ROOSEVELT,
CHARLES A. PEABODY,

Nominating Committee.

On motion of Mr. Henry K. Southwick, duly seconded, Mr. Clinton Roosevelt was appointed to cast the vote of the Society for the nominees; and they were declared duly elected.

The President then introduced the speaker of the evening, Mr. H. Ballantine, who delivered an address on the "Vale of Cashmere."

On motion, the Society adjourned.

Special meeting of January 28th, held at Chickering Hall.

President DALY in the chair.

On motion, it was voted to dispense with the reading of the minutes of the last meeting.

The following persons were elected Fellows of the Society:

R. J. Nunn, M.D., Fred'k O. Prince, Samuel H. Russell, Jesse Young, Geo. W. Vanderbilt, Fred'k G. Bromberg, Rowland Hazard, H. D. Harrower, Frank A. Jayne, John H. Hayward, Orlando M. Harper, Frederick Robert, Wallace Wood, Gardiner G. Hubbard, Brace Hayden, Prof. Chas. Sprague Smith, Geo. C. Clausen, Chas. F. Clark, Prof. Geo. Forman, A. S. Hallidie, Walter W. Law, Robt. F. Wilkinson, F. Griswold Tefft, Joseph Tuckerman, Alexander E. Orr, E. P. Alexander, W. E. F. Deal, Jas. F. Buckner, Jr.

The President then introduced to the Society Mr. Carl Lumholtz, of Christiania, Norway, who gave an account of his observations during "A Residence among the Aborigines of Australia."

On motion, the Society adjourned.

Meeting of February 11th, held at Chickering Hall.

President DALY in the chair.

The reading of the minutes of the last meeting was dispensed with.

The following persons were elected Fellows of the Society:

Hon. George E. Adams, D. H. Bidwell, Norman Henderson, Charles R. Crane, Edward R. Biddle, William T. Emmet, John E. Peabody, Augustus C. Gurnee, David Lydig, Welcome G. Hitchcock, Wm. H. Rowe, M. J. Keogh, H. H. Greene, Dr. George Marsland.

President DALY then introduced the speaker of the evening, Dr. Titus Munson Coan, who delivered an address on "The Sandwich Islands: their Volcanoes and People."

On motion, the Society adjourned.

Meeting of March 12th, held at Chickering Hall.

President DALY in the chair.

The reading of the minutes of the previous meeting was dispensed with; and the following persons, recommended by the Council, were elected Fellows of the Society:

Walter R. Leggat, G. K. Gilbert, W. D. Baldwin, Henry J. Davison, Arthur F. Bissell, Clinton G. Reynolds, Eugene W. Durkee, John L. Hardee, Frederic D. Philips, E. B. Gage, Charles Renauld, William Sellers, John D. Cheever, George Abbot James, David W. Armstrong, Thomas Baring, John Screven, Chas. E. Peck, Wm. Reynolds Brown, C. N. Hoagland, M.D., John H. Gourlie, Jr., E. R. Squibb, Francis Spies, Norman S. Bentley, Wm. W. McFarland, H. A. Du Pont, Alfred Roelker, James B. Dickson, Edward Steinbrügge, Alfred M. Townsend, T. Egerton Hogg, J. M. McBryde, Wm. N. Amory, Hoffman Atkinson, W. A. Ross, Pierre J. Smith, E. J. Denning, Poultney Bigelow, Charles E. Bidwell, Jonathan Dwight, Jr., Robert Bowne, Josephus F. Holloway, Everett Frazar, George H. Daley, S. C. T. Dodd, Stephen S. Palmer, Geo. Dacre Bleything, Somerville P. Tuck, Edwin H. Abbot, Edwin H. Mead.

President DALY then introduced to the Society the Rev. Lysander Dickerman, who delivered an address on "The Discovery of a Forgotten Nation (the Hittite Empire)."

On motion, the Society adjourned.

Meeting of April 16th, held at Chickering Hall.

President DALY in the chair.

The reading of the minutes of the previous meeting was dispensed with.

The following persons were elected Fellows of the Society :

J. D. Sutton, John T. Farrish, Chas. H. Wilkin, M.D., Geo. Carlton Comstock, Edward B. Harper, S. C. Harriot, James M. Halsted, Wm. Hancock Clark, Charles Sobysmith, Henry C. Howells, Joseph Struthers, Robert M. Thompson, Peter Donald, Edward Mayes, Eugene M. Cole, David W. Fenton, Thomas Lowthian, Charles Tatham, Rev. Wm. C. Roberts, A. N. de Goicouria, Harvey Edward Fisk, Wm. J. Henley, Christian Weber, Frank K. Hain, Harrison E. Webster, Ethelbert D. Warfield.

President DALY then introduced Prof. F. A. Ober, who delivered an address, entitled "Algeria, with a Glance at Tunisia."

The Society, on motion, adjourned.

Meeting of October 28th, held at Chickering Hall.

President DALY in the chair.

The reading of the minutes of the previous meeting was dispensed with :

The following persons were elected Fellows of the Society :

J. Augustus Dix, Henry A. Smith, James Milliken, J. Van D. Reed, J. H. Brower Browning, M.D., Alexander Maitland, Theodore H. Freeland, Henry Kimber, M.P., Joseph A. Gargiulo, John L. Gardner, George L. Putnam, Woodruff Sutton, Juan G. Ribon, James Macdonough, Charles R. Flint.

President DALY then introduced to the Society Miss A. Russell, who delivered an address on "South African Republics, their Races and their Progress, their Diamond and Gold Mines."

On motion, the Society adjourned.

Meeting of November 11th, held at Chickering Hall.

President DALY in the chair.

The reading of the minutes of the last meeting was dispensed with; and President DALY, after a few preliminary remarks, introduced Mr. Cope Whitehouse, a Fellow of the Society, who deliv-

ered an address, entitled: "The Raiyan Moeris : the Irrigation of Ancient and Modern Egypt."

The address was illustrated by maps, ancient, mediæval and modern, as well as by views on the Bahr Jusuf and in the Fayum.

On motion, the Society adjourned.

Meeting of December 9th, held at Chickering Hall.

President DALY in the chair.

On motion, the reading of the minutes of the last meeting was omitted.

The following persons were elected Fellows of the Society: Wm. Thaw, Jr., S. M. Felton, Jr., Geo. A. Jones, Edward A. Le Roy, W. G. Steel, William C. Freeman, Isidor Straus, Henry W. Sackett, Walden Pell, Geo. Bronson Rea, John J. Carter, Mrs. M. Schuyler Elliot, Julius Dexter, W. R. Birdsall, M. D., Isaac Ickelheimer, Robert C. Fisher, Walter Kobbe, F. J. Kimball, John J. Lagrave, Hon. Orestes Cleveland, S. Endicott Peabody, Erasmus Gest, Arthur T. Sullivan, Charles J. Fitzpatrick, W. H. Barnes.

President DALY then introduced to the Society Miss Amelia B. Edwards, who delivered an address on "Recent Discoveries in Egypt."

On motion, the Society adjourned.

Meeting of December 19th, held at Chickering Hall.

Vice-President CULLUM in the chair.

The reading of the minutes of the previous meeting was dispensed with.

The following persons were elected Fellows of the Society: Francis H. Peabody, William H. Morgan, N. Pendleton Rogers, Jacob K. Lockman, John J. Waterbury, Thomas F. Ryan, John W. Pirsson, Geo. M. Whitehouse, Joseph Collett, Léon Marié, Daniel H. Newton, T. Mitchell Tyng, Enos T. Throop, Alex. G. Hackstaff, Col. Wm. E. Prince, U. S. A., Wm. J. Palmer, A. Cookman Roberts, Chas. H. Trask, W. Y. Mortimer.

It was moved and seconded that a Committee of Three be appointed by the Chair to select suitable candidates for the offices to be filled at the Annual Election in January, 1890, and to report at that time.

Transactions of the Society for 1889. lxxvii

Vice-President CULLUM appointed the Committee as follows:

N. P. Bailey, *Chairman*; Clinton Roosevelt and Charles A. Peabody.

The Vice-President then introduced to the Society the Rev. George W. Chamberlain, of São Paulo, who delivered an address on the "Conditions and Prospects of Brazil."

On motion, the Society adjourned.





CARL LUMHOLTZ IN TRAVELLING COSTUME.

BULLETIN
OF THE
AMERICAN GEOGRAPHICAL SOCIETY

Vol. XXI

1889

No. 1

A RESIDENCE AMONG THE NATIVES OF
AUSTRALIA.

BY

CARL LUMHOLTZ, M.A.

ACADEMY OF SCIENCES, CHRISTIANIA.

During my four years' stay, from 1880 to 1884, in Australia, where I was sent by the University of Christiania to study the fauna and the aborigines of that continent, I had the opportunity of living for about twelve months among the cannibals in the northeastern district of Queensland, very often in parts where no white man had ever before put his foot. It is chiefly about my experience among these people that I intend to tell you to-night, but I must necessarily trouble you with a short introduction about the country itself, its scenery, its vegetation and its climate.

In Europe people seem to have very vague ideas about Australia and life out there. I recollect once being asked in Norway, my native country, whether forks and knives were used in Australia. Such a question alone shows how little people really know about that part of the world. They have no idea of the

wealth, the advanced state of civilization and the luxury to be found in the southern part of that continent. Australia is, above all, the land of minerals and pastures. I need hardly refer to its enormous amount of gold and to its millions of sheep and cattle, which supply the markets of the world. In the South you can get whatever you may want to make your life comfortable. Ladies have their dresses made in London and Paris. I remember having once at a race-course seen a lady with a dress that was said to cost £1000. But the farther north and the farther west we go, the more we get away from civilization, till, at last, we meet the lowest and most degraded type of humanity—a people in the most primitive and savage state of life—a people whose highest conception of numbers does not extend beyond 5.

You may compare Australia with a gigantic dinner-plate. The interior is a flat country of medium height (300 to 2,150 feet), rising towards the border. The edge of the “plate” is highest in the S. E., where, in the Mount Kosziusko Range, Mount Townsend rises to 7,059 feet above the level of the sea. Very distinct is the edge of the “plate” along the eastern coast, where stretches a continuous, although not very high, mountainous country, from Victoria through the eastern part of New South Wales and Queensland into the York peninsula, which bounds the great Carpentarian Gulf towards the East. The whole mountain district is by the Australian geographers (*e. g.* G. Sutherland,) called by the common name of the “Great Dividing Range.” The single parts of this mountain ridge have different names, *e. g.* the Australian Alps, where Vic-

toria and New South Wales meet together, and the Blue Mountains west of Sydney.

Round the lower part of the Carpentarian Gulf and in a part of the southern district of Australia the "edge of the plate" is broken, and low and flat country here stretches from the sea far into the interior. On the other side rises from the "bottom of the plate" in Central Australia some higher land, which, however, nowhere so far as is known reaches 3000 feet.

This Dividing Range stretches along the eastern coast of Australia at a distance of from 50 to some 300 miles inland. It forms, as a rule, the watershed between the eastern and western waters, but there are chains of mountains visible from the coast that often are of greater elevation than the range itself, such as the above-mentioned Blue Mountains, where the streams, on their way to the Pacific, break through the mountains in picturesque chasms. The Dividing Range is sometimes not very easily traced. The spurs coming from it, as well as detached mountains near the coast, are often much higher and are frequently taken for the main range. This range, by throwing off rain and creating streams, has made the eastern part of Australia far more fertile than the western.

Layers from the coal period have a great extension in Queensland, and the northeastern part of New South Wales; so Australia, besides her other mineral wealth, possesses also the "black diamonds." In several places strata from the mesozoic period of the earth's history have been traced.

The remains of animal and vegetable life found in the older strata agree as a whole with those found in other

parts of the world from the same periods. Once, however, during the mesozoic time, Australia must have been isolated as a continent by itself. This plainly appears during the tertiary period; during this, most part of Australia seems to have remained an independent continent. This also was the case during the quaternary period or the geological present time.

Australia has no active volcanoes, but extinct ones are found in several places. Some of those that are to be found in Victoria must be considered to have had eruptions not long before the historical time.

This "Land of the Dawning," which, generally speaking, remains now as it was during the tertiary period, shows a corresponding primitive and peculiar fauna, as well as flora, with its proteacea, leafless casuarina-trees and acacias, which remind you of the extinct vegetation of the older tertiary period. The greater part of the Australian mammals consist of the curious marsupials which belong to the oldest and lowest organized of all known mammals, and which have, without doubt, remained from an earlier geological period, during which they also lived in Europe. Here are also found the two most remarkable mammals on the globe: the duck-bill (*ornithorhynchus anatinus*) and the spiny anteater (*echidna*), which, it has lately been proved, lay eggs and afterwards suckle the young. Among the birds, the country has some peculiar species (*megapodidae*), the only ones upon the earth, which do not themselves hatch their eggs, but, like the reptiles, bury them in hot sand or in hills of earth, the fermenting ingredients of which, by producing heat, hatch the eggs.

The class of mammals gives the Australian fauna its

characteristic appearance. Imagine a continent almost of the size of Europe without any mammals, except marsupials, besides some bats, rats and mice. There are none of those species from which our domestic animals have been developed.

The marsupials appear in some parts of Australia in countless numbers, and are very destructive to the grass. From 1880 to 1885 the Government of Queensland paid premiums for five million heads of the larger marsupials.

I undertook two journeys of importance during my stay in Australia. The first one was to the interior of Queensland, from Rockhampton, under the Tropic of Capricorn, about 800 miles west. Near the coast the climate is naturally more moist and the landscape sometimes even approaching to the picturesque. But as a rule the Australian landscape is more grotesque than beautiful, and it has a marked look of melancholy about it. The farther you go west the more does the whole scenery assume a dry aspect. In western Queensland they think nothing of it if they have no rain for eight or ten months. The grass is gray almost all the year round, but still this undulating country, the so-called downs, forms splendid pastures for hundreds of thousands of sheep and cattle; and the squatters store the rain-water in dams, and thus preserve it for one and even two years. Western Queensland, near Diamantina River, is one of the hottest places in the whole of Australia, the thermometer having registered 125° in the shade for three consecutive days. The air is so dry that perspiration is not felt. The soil is a rich, chocolate-colored deposit of clay, and it is a general belief that the large western country will in a short time, by means

of artificial irrigation, become a great wheat-producing country. Artesian wells have recently been bored in several places. In 1887, *e. g.*, water as clear as crystal and perfectly fresh was struck at a depth of 690 fathoms. In the 10-inch pipe it rushed up like a fountain, throwing up water at an estimate of 200,000 gallons a day. This was about 500 miles from the coast.

The other and by far the most interesting journey was to the delightful tropical regions of Northern Queensland.

In Northern Queensland the Dividing Range attains a height of 2,400 feet, and in consequence of the heat and moist climate the mountains are covered with dense brushwood—which the Australians call scrub—of enormous extent and great luxuriance,—a complete contrast to the ordinary Australian landscape, with its monotonous plains and its melancholy white-stemmed gum-trees (*eucalyptus*) and acacias scattered here and there. There are all sorts of trees and bushes in astounding number. Most noticeable is the Australian vine (*Calamus Australis*), twining along the trees, for hundreds of feet, through the forest, and sometimes rising in gigantic coils that make all passage impossible. One species of palm the colonists call by the not very poetic name of "Lawyer palm," because its sharp thorns tear one's clothes and draw blood from the skin. No less unpleasant is a huge stinging-nettle (*Laportea moroides*), whose beautiful heart-shaped leaves sting painfully. So poisonous are these leaves that their mere movement produces sneezing; whilst any one stung by them soon experiences an acute pain all up the arm as far as the lymphatic glands in the arm-pit. This is followed by dis-

turbed sleep at night, but no further unpleasant effects worth mentioning supervene. The antidote to this plant is, strange to say, always found in its immediate vicinity, in the same way as the kusso plant is found in Abyssinia, the native country of the tape-worm. That antidote is the sap of the *Colocasia macrorrhiza*. Besides these troublesome plants, a large number of very useful and beautiful ones are met with in these regions, such as the fan-palm, the common Australian palm, the banana, etc. In the higher mountain regions, the gigantic tree-ferns grow in great splendor, their huge leaves broadening out over the transparent water of the brooks that trickle at their feet.

The water-supply of these mountain regions contrasts very strongly with the dryness of the Australian soil elsewhere. Here are any number of brooks, that now run into the most beautiful waterfalls, now flow into stately rivers. These rivers have, of necessity, a comparatively short course, but they carry for the most part a vast volume of water and they are accompanied by a dense undergrowth of jungle that extends to their very mouth. The soil in this region—along the rivers—is generally of incomparable fertility, and if the undergrowth is rooted up by the white settler, or more accurately, by his dependents, the Kanakas, the sugarcane does wonderfully well. Tobacco and coffee also thrive well in this moist climate; only thus far, the right sort of tobacco to cultivate has not yet been found. In like manner, the cinchona plant, rice, arrowroot, everywhere thrive well in this region, but none of these plants is as yet cultivated, except on a very small scale.

The white settlers remain in the lowlands and never go up into the thickets of the mountain districts. Here, in natural conditions as yet unchanged, dwell the black aborigines, whom no white man cares to disturb. For they can find him neither gold, nor diamonds, nor anything else that would tempt him to encounter the difficulties of a journey to their haunts. I had, however, long wished to study these savages, the Australian aborigines, the lowest of the human race, in their actual conditions of life. For the ethnological student no phase of human life is as interesting as the most primitive one. And as you can get no reliable knowledge of a people except by living among them, so I made up my mind to live with the savages in their huts. A further inducement to risk the dangers connected with such a stay was my belief that by their help I could get many specimens of Australian fauna, which I should in no other way be able to procure.

Of course, I could not at once go and live with them, but had to work my way gradually. I had, then, been in Australia more than a year and, of course, had acquired some experience as to how to proceed with them. I first began to associate with the so-called civilized blacks, and through them, by degrees, became acquainted with other tribes, until at last, I lived with natives who were in the most primitive state of life and had never come into contact with a white man. By civilized blacks we generally understand such of the natives as have to some degree been affected by European culture; but the extent of their civilization may be briefly summed up thus—that a civilized black knows he will be shot dead if he kills a European, is

greatly addicted to tobacco, and is fond of wearing clothes which he considers more as an ornament than as a useful article.

The natives living around my headquarters at Herbert Vale had, during the last couple of years, commenced to visit the station every now and then, and thus they rightly deserved the name of civilized, although scarcely any of them possessed a single article of dress. Especially would they crowd into the station when old Walters, the keeper of the station-houses, and Nelly, an aboriginal girl who served us as cook, had killed a bullock. The bones and the intestines used to be their share, and this offal of civilization was considered such a delicacy, that they caught it eagerly with teeth and hands, and the possession of these valuable leavings was not decided without a general fight.

I followed these so-called civilized natives on their hunting expeditions, witnessed their fights and their dances, and grew familiar with their language and customs, until I found that I could venture further into the country and meet the more savage tribes. I therefore undertook several expeditions from my headquarters. The greatest trouble was to get the blacks to take part in my excursions; for they are born idlers and have a fundamental objection to any kind of work. Luckily, in the last six or seven months of my stay in that region I happened to find a really good servant. He stuck to me, wherever I went, so that my position, from the time of his advent, grew much more favorable. He was by no means an ordinary black, but was possessed of a peculiar vein of *naïveté*, and so he often blurted out ideas and information of the greatest value.

In spite of this he was not at all free from the treachery characteristic of all the natives. Nevertheless, he was better than the others, and saved my life many a time. Of course, I dared not trust myself to him unreservedly, for all blacks are like children, the sport of caprice and the inspiration of the moment, and are especially prone to deceit. The pair of us were fortunate enough to find, as a rule, four or five of the blacks willing to go with us; sometimes a whole tribe, with its women and children.

As far as this method was possible I rode alone, whilst my blacks went on in front, one of them leading my pack-horse. At the foot of the mountains a camp was pitched, and here the horses were left behind, whilst the saddles and bridles were placed in a tree, so that the wild dogs should not get at them. Then we went up the mountain on foot—the dense underwood there, of course, being impassable for horses. My provisions consisted of fourteen or fifteen pieces of ox-flesh, pickled and dried, with a small quantity of wheat flour to be baked into bread in the hot ashes, and some sugar. When these provisions were exhausted, which occurred pretty quickly, we lived, like the aborigines, on young snakes, lizards, larvæ, eggs, and the like. My outfit included a large, white, woollen blanket that was a standing wonder and a constant envy of the blacks. As soon as I unpacked it they made a clicking noise, expressive of delight, with their tongues, and roared out, “Tamin, tamin” (fat, fat)! Anything that is very good they call “fat.”

One of the most important things I brought with me was tobacco, a greater joy to the aborigines than the

very best food. At Herbert River the blacks did not know, before the arrival of the whites, of any stimulants at all. The tobacco served me instead of money, and for it they would do anything, even to selling their wives. Among these people tobacco is always smoked, never chewed, and I have often seen a mother, carrying a child on her back, hand it a pipe, at which the child would take a couple of puffs with apparent delight. They often used to send, in barter, small bits of tobacco, wrapped up in gum, to other tribes, and in that way tobacco is known among remote tribes who have never themselves come into contact with Europeans. Next to tobacco, my revolver was of the greatest importance to me. Very luckily the natives, who do not themselves possess even bows and arrows, have the greatest respect for fire-arms. It is, however, necessary to keep up your reputation as a good marksman, else you will soon lose their respect. Their astonishment is equally great when you hit a kangaroo in a resting position, or when you bring down a bird on the wing. They were especially afraid of my revolver, which they looked upon as inexhaustible. I made it my business to keep this fear constantly awake, and every night before creeping into my hut, I discharged the "baby-gun," as they called it, just in order to refresh their minds as to the existence of this dreadful weapon.

In the evenings, just before sunset, we pitched our camp and settled down for the night. I had a hut made by the natives every evening in their ordinary way. The huts are built in a few minutes and consist of palm-leaves stretched across a slight frame-work of boughs. They are about three to four feet high and have a large

opening on one side. I always had my hut made so long that I could lie down at full length, but the natives I generally found lying two to three closely huddled together with their feet projecting outside.

Happily for me I felt in the winter-time the cold at night, owing to the great contrast with the heat of the day-time, and in consequence I awoke several times every night and had to wake the blacks to keep the fire burning before our huts. This gave my men the impression that the white man slept but little and that he was always on the alert and had the baby-gun ready. It was necessary always to be on one's guard, as the blacks are of a very treacherous and cunning nature, and one of the most important precautions that a colonist learns to take, is, "never have a black fellow behind you." The natives never seem to lose their inherited impulses, as the following experience of a squatter on Thomson River will show. He had, one day, gone shooting with his black boy, and as he was walking through the forest in front of his servant, the latter clapped him on the shoulder and said: "Let me go in front of you and shoot; behind I feel too great a longing to kill you."

I had a good deal of unpleasantness and many troubles through their deceit and cunning, which often made me so tired and worried that I was on the point of giving up the expedition, but the thought of perhaps being able to make valuable discoveries in this strange and interesting country always kept my spirits up, and I must say that I was not disappointed, but have returned with interesting facts and specimens of natural history, new to science, and with an intimate knowledge of the life and habits of the Australian aborigines,—one of

those unfortunate races that are rapidly dying out. On the other hand I was cheered in my work by the many delightful impressions I received of the grand and splendid scenery around me on my wanderings, sights I shall never forget. When the tropical sun rose in the early morning above the lofty trees of the Australian forest and awakened nature with its bright, dazzling rays, or when the moon appeared above the mountain ridge and threw her pale light over the vast plains below, while the mystic voice of the night-birds rang out on the still atmosphere, there was a beauty over the landscape to which I could not possibly do justice if I were to attempt to describe it.

The Australian aborigines are generally called blacks, but their color is really chocolate-brown, which can be seen best when they go into the water. In the summer-time they dive down into every pond they meet on their way, not from any love of cleanliness, but to cool themselves off. In the winter they never bathe. Newly-born children are yellowish-brown, and rapidly turn darker as they grow older; those of two or three years are as dark of hue as the adults.

On the coast they are of rather small stature, but in the interior of medium size and sometimes even very tall. One man who was well known among the whites near Mulgen, in Central Queensland, attained a height of 7 feet. The aborigines are much less muscular than the Europeans, especially in the calf of the leg. Their bodily strength is, in consequence, decidedly less; yet they have an extraordinary command over their frames and they move with much dignity and grace. Their women have the pose and movements of ladies. The

whole build of an Australian is notably fine and finished, I had almost said elegant. One of their most striking features is the low forehead and the strongly marked projection above the eyes, pointing to the fact that their powers of perception are good. All evidence leads to the same conclusion. Their eyes are always dark, with the whites of a dirty yellowish hue and with the capillaries very marked, a peculiarity that gives to the face a wild look. The nose is flat and triangular, very narrow above, so that the eyes are placed very close together.

The fleshy nasal partition between the two nose-cavities (*septum*) is exceptionally strongly developed. The aborigines often perforate it and stick through it a peg as an ornament. My companions who, of course, had neither pockets nor pipe cases, were in some difficulty as to where they could best keep the clay pipes I had given them, but they soon found a safe place for their pipes by putting them, instead of the peg, through the hole in their nose.

Sometimes I came across men with almost Roman noses, and you might believe, especially in Northern Queensland, that an interbreeding had occurred with Papuans, who, as is well known, are very proud of their big noses. The cheekbones are very prominent; the mouth is large, open, and in many cases anything but beautiful. The teeth are white, regular and very powerful, but on account of the coarse food and from being used for many purposes for which a white man would not think of using his teeth, *e. g.*, biting off tough and thick branches, making tools, etc., they grow at last very sore and are worn down to the gums. The chin is tolerably short.

Hair and beard are jet-black ; the hair is not woolly but more or less wavy. Occasionally it is quite straight, but on the Herbert River this was a rare and exceptional case. When their hair begins to be troublesome to them by reason of its length, the blacks take a lighted brand from the fire and simply burn it off. Once at my headquarters I saw a young man cutting his hair with a blunt axe he had borrowed. Fragments of glass are used for the same purpose. Men and women wear their hair of equal length.

As a rule, they are an ugly race, but now and then really good-looking individuals occur, more especially among the men, who, in general, have better figures than the women. Yet even among the latter I have sometimes seen what I should call "black beauties."

Their hands were small, their feet dainty and well-shaped, and their insteps so high that one would involuntarily ask where in the world they could have acquired this distinctive mark of aristocratic descent. Sometimes the young women have excellent figures; their skin is as delicate as velvet. When those black daughters of Eve laugh, showing their incomparable white teeth, and cast coquettish glances from under their wavy hair, hanging in quite the modern fashion over their brows, it may be understood that these women are not quite deprived of that influence ascribed by Goethe to the fair sex generally. They age very early, though. And I must confess I can hardly imagine any human being more ugly than these old women, crouching over the fire and rubbing their bony limbs. They seem to have no muscles left; their stomachs are prominent, their skin wrinkled, their hair

grey and thin, their faces unusually ugly, so much the more as their eyes have almost disappeared. I often wondered why the men did not kill these old women who, I thought, were a great trouble to them, for I had seen that the Australian aborigines made short work with anything that gave them trouble or worry, but later I learned that the old women are rather useful than otherwise to the tribe. They are very clever in finding food, and not only do they support themselves and the weaker members of their sex, but I have also observed that they gave food to young men who were too lazy to find any for themselves.

The sense-organs of the aborigines are well-developed, and their sight especially is unusually acute. They can see, at a height of sixty feet or more, the Australian bees, which are smaller than our domestic flies, enter their nests in the trees. They can also stand the vertical sunlight much better than we. If an Australian black is digging any animal out of the ground, a handful of the soil held to his nose is enough to tell him if the animal he is in search of is at home or not. When he is going through the woods, he will take up, as he passes along, a handful of earth or a leaf in order to tell by the smell if any animal has passed that way.

The Australian aborigines are a healthy race and not very subject to disease, except in cases where they have become "civilized"—have taken to clothes—when disease begins among them. The Australian who, on the Herbert River, goes abroad quite unclothed, is, as I have already said, very proud of the possession of garments. But he regards them only as ornaments, and

takes them off when they are most needed. I have seen Australian natives, in the greatest heat of summer, sweating in woollen jackets, while in the cold nights they will be sure to take them off. As a consequence, colds and chest complaints result. But I have never seen a black catch cold as long as he was living in his natural conditions. Climatic fevers are just as rare among them. I only saw one native down with fever, and he was "civilized"—wore clothes, caught cold to start with, and then took fever.

The Herbert River blacks use no kind of medicine. The only thing they will sometimes do is to suck the blood from the part in pain, or to smear it over with their saliva.

Toothache occurs now and then among these people. If it is a back-tooth that is giving pain, the patient gets another black to suck blood from his cheek, much as we use leeches. If it is a front-tooth a very radical cure is sometimes employed. A sharpened piece of wood is placed against the tooth, another fellow strikes it, and the tooth is knocked out.

The aborigines are not so sensitive to pain as we, but they give in much quicker. If one of them gets ever so slight a cut on one of his toes, he is at once a universal object of commiseration, and keeps at home in camp.

In my opinion the men live to a little over fifty, an age rarely attained by the women on account of the hard life they have to lead.

Like all savage people the Australians are much given to the adornment and painting of their bodies. Sometimes, especially at their dances and fights, they

besmear their whole body with red or yellow earth, or with powdered charcoal and fat, as if they were not black enough already. They also use cicatrices, or the scarring of their flesh, as an adornment for their bodies. For this purpose they make use of a sharp stone or a mussel-shell, with which they cut deep parallel lines all over their chest and abdomen. To prevent these wounds from healing, they sprinkle powdered charcoal or ashes into them, or sometimes they let ants run about in the wound, the result being that the lines will swell up in ridges as thick as a finger. This kind of ornamentation they consider very beautiful, and it is also indicative of a certain rank dependent upon the age. A little boy has no marks. In due time he is marked with lines. The number of these markings is increased as he grows older, and a crescentic line, with the points bent outwards, is drawn around the nipple. Only the men are thus decorated with marks of rank, while the women have some clumsy markings upon their breast and arms for decoration. Tattooing, as it is generally understood, by puncture of the skin with a pointed tool, is not employed by the Australians.

The languages of the natives of Australia are as various and numerous as the tribes into which they are divided, although upon a closer examination, it appears that all these languages are in some measure related to each other so that they may properly be styled dialects derived from one common source. Thus, for instance, the word for *eye*, "mill," has a very similar form all over the continent, and the same is the case with the word for *two*. As yet no definite kinship between this Australian language and any language outside of Aus-

tralia has been proved, although the theory has recently been advanced and supported by an apparent similarity in words and also in customs and superstitions, that in spite of difference in appearance, there exists some kinship between the African and the Australian negroes. Of a written language there is no trace, unless the message sticks by which they communicate one with another can be counted under this head. It has been stated that the Australians cannot pronounce the letter *s*. This is inaccurate. On the Herbert River, for instance, the word for tobacco (*sootloongo*), has an *s*-sound. The dialects of the Australian blacks are polysyllabic, and the accent is generally on the second or third syllable from the end. They have a by no means unpleasant sound, many words being notably musical, a music to which the abundance of vowels contributes. As to consonants, the gutturals predominate. In many cases a most imperative brevity is noticeable; a whole sentence often is condensed into one word. "Will you go with me?" is "*Nginta*," which in reality only means *you*, while a gesture completes the sentence. To this the answer is: "*Ngipa mittago*," meaning "I will go home"—literally, however, it means "I with respect to the hut."

This suffix "go," in order to avoid an extensive grammar, is much used, and is added to verbs for the purpose of inflecting them. On the Herbert River the aborigines have words for the three first numbers—*yongool*, *yackan*, *carbo*. Number four and all the others are to them *taggin*, *i. e.*, many. Their vocabulary is very limited. They have no general names, like *tree*, *bird*, *fish*, etc., but every single species has its own

name. Curiously enough they have words not only for the animals and plants, of which they make use themselves, but also for those for which they have no use or interest at all.

As they do not cultivate the ground and keep no domestic animals, they naturally do not want many implements. One of the most important is a long stick, which the women use for digging up roots, grubs, etc., and a stone or iron axe, which, of course, is also used as a weapon. They are clever with their fingers. Some strong and beautifully made baskets for carrying fruit, etc., are made by the men. Besides the axe or tomahawk, their weapons consist of spears, clubs, great wooden swords, shields, etc., but the most remarkable is the well-known boomerang. There are two kinds of boomerang, one, the returning, used only for amusement, while the other, that does not return, is used for killing game and in warfare. It has been asserted that the Egyptians and the Assyrians knew the boomerang, and the conclusion has been drawn that the Australians descended from a more developed race than the present one. It is, however, rather doubtful whether the Egyptian or Dravidian boomerang was the same as the Australian.

The low state of civilization of the Australian native is easily understood from a look at his weapons and implements. Most of them are wooden. At Herbert River the natives almost exclusively use spears in hunting, but when they are walking around in the extensive and thick brushwoods, they, as a rule, move about perfectly unarmed. If they get a glimpse of any animal, they break off a stick, and try to kill it by throwing at

it. Herein, as a rule, they succeed, as most of the animals live in the trees, and have a great difficulty in escaping when the natives from several sides climb up and encircle them. If an animal has been killed and is going to be prepared, the belly is opened with the first stone, or a suitable piece of hard wood, which may happen to be in the way. With a stone, or with their teeth, the men divide the prey among them. Their knives are flint-flakes, which they either find accidentally, or obtain by blasting a rock with fire and water, and in no case do they apply more work to them.

Thus the Australian aborigines may be said still to be in the palæolithic state, and they must even in some respects be considered not to be above, or perhaps even below, the men of the quaternary period.

The food of the blacks on Herbert River is chiefly vegetarian, although most of the vegetables they use are, in their uncooked state, positively poisonous, and require the most complicated preparation by means of roasting, beating, and soaking in water before they are fit to be eaten. Besides this, they eat a deal of flesh-food, such as opossums, lizards, snakes, and other animals. But they eat nothing raw; everything is cooked—not, be it noted, in boiling water, but by roasting in the hot cinders or ashes. The greatest delicacies, such as human flesh and big snakes, are cooked by placing the food between hot stones and green leaves in earth-mounds, just as clams are often baked. The flesh of the large lizards is really good, something like chicken in appearance and taste, but that of snakes makes a dry and tasteless dish.

Most of the animals eaten live in the trees; and the

natives naturally grow very clever in climbing trees. Those around Herbert River excel, in this respect, all the other Australians that I have seen. Also the honey of the wild Australian bee that is found high up in the trees is a valued article of food, and the natives sometimes even feed on it for days. Sometimes the honey has undergone fermentation and becomes sour—something, however, that does not offend the appetite of the natives. I used this honey myself instead of sugar to mix in water, thus making my frugal meals more enjoyable. The honey, however, always caused me, and often the natives, diarrhœa; which, I think, is rather an interesting fact, as I can eat any quantity of the domesticated bees' honey with perfect safety. Both this indigestibility of the Australian honey and its fermentation are due to the fact that these wild bees have no poison and only a rudimentary sting, the poison of the domesticated bee serving to make the honey digestible as well as to preserve it against undergoing fermentation.

The eggs of the brush-turkey (*talegalla*) are among the great delicacies of the blacks. They are prepared in a practical manner by being placed in hot ashes, so that they cook in their shells. Frequently the eggs are addled, but this makes no difference whatever to the natives—on the contrary, they prefer these to the new-laid ones. The eggs are then eaten with the help of a piece of cane, the end of which is chewed till it resembles a brush.

The blacks have also a great predilection for eggs of ants, for grasshoppers, and especially for the larvæ of some large species of *coleoptera* that live in the stems

of decaying trees (particularly *euranassa Australis*), and frequently attain the length and breadth of a finger, of dazzling whiteness and very fat. The natives cut them out of the tree with the aid of a stick or an axe, and are so delighted at the find that they cannot resist swallowing a few of them alive. The rest are placed in baskets and baked in the ashes; they then become crisp. I convinced myself of their pleasant taste, and, strange as it may seem, I considered them a great delicacy, and certainly they formed the best food which the blacks could bring me. They are like an omelette, with a flavor of nuts.

When the natives come down to the grasslands, they are very fond of hunting wallabies by burning off the grass and spearing the animals.

I may also here mention an animal which I succeeded in finding, after three months' search, and which the natives also used for food—the 'tree kangaroo (*dendrolagus Lumholtzii*), one of the mammals new to science,—discovered by me during my stay in Australia. This animal is as big as a sheep and lives in the most inaccessible parts of the scrub-covered mountains, and is, therefore, very hard to get at.

The mutual relationship of the different tribes is still, on the whole, that of the lowest grade of the human race.

Among themselves they are kind and friendly, to such an extent, even, that they carry their sick members along with them on their expeditions and care for them, and this is really the only noble trait of their character I have been able to discover. To all outsiders they are, however, absolutely hostile, and woe to the black who should stray into the domain of another tribe. If he is

discovered, he is sure to be killed and eaten by his enemies. War still exists here in its original form, treacherous murder of single individuals and cowardly attacks from ambuscades upon small tribes. Never, at Herbert River, would a tribe dare to meet another in open fight.

It must also be mentioned that chiefs are never found among the blacks. Once or twice they asked me to lead their attacks upon other tribes ; but this was only for the occasion, because they thought that my gun would be of good effect upon their enemies. On important occasions the elders of the tribes are consulted ; occasionally, too, I saw them even take an old woman into their counsels. It is true she was very clever in procuring, with the aid of her husband, *talgoro* (human flesh) ; what wonder, then, that she was much looked up to ! In other Australian tribes there are chiefs ; sometimes even two, *e. g.*, near the Gulf of Carpentaria. But, it must be noted, the personal liberty is never interfered with ; if a man wants to remain at home when the tribe starts for an expedition he is always free to do so.

One of the ways in which they settle their differences is by means of the so-called *borboby* (a tournament), where about 200 or 300 persons from different tribes meet and settle disputes, not only between the tribes, but also between the individuals. Three or four times each summer they meet for *borbobies*. Several pairs fight, at the same time, regular duels with wooden swords and shields. The old women play a great part at the *borbobies*, by their inciting the men with jumping in the air and their wild, deafening howls—three or four standing behind each of the combatants. As soon as one is suc-

cumbing they hold their sticks protectingly over him against the sword of the victor.

With the exception of murder of a member of the same tribe, the Australian native does not consider anything as a crime except theft. However, infringement of the property right of another is not punished by society, but is settled between the individuals. The robbed one challenges the thief to a fight with wooden sword and shield, and the settlement takes place now in private, the relatives of both parties serving as witnesses, now publicly at the *borboby*. Whoever wins the fight is held to be in the right.

To steal women, also among these savages thought to be man's most valuable property, is the grossest but also the most common theft; for it is the common way of getting a wife among the Australians. So the *borbobbies* are almost entirely fights about women, of whom a great number change hands on such occasions.

The public dances also bring several tribes together, but these are all friendly. The dance is conducted by fourteen to sixteen men, in ranks of four or five men. They march up and down with contortions and movements of the body in perfect time, while the orchestra, consisting of one single man, sings its monotonous air, accompanied by the clattering sound of wooden weapons beaten against each other. Only one woman takes part in the dance, jumping up and down on the same spot all night long, her arms outstretched and her fingers spread apart, and this is for her a great honor, of which the other women are highly envious.

In their other social relations within the tribe they are all on the same level. The more wives a man has,

the richer he is, for the women do all the work and attend to everything. Generally speaking, the Australian has not more than two or three wives; in individual cases, however, I saw as many as five following one man. The woman is nothing but a slave, whom her master may ill-use or kill if he likes. There are three ways of obtaining a wife: either through the woman being made over to the man, as a living inheritance, or by being bartered for a sister or a daughter, and it is a curious sight to see an Australian black go about with his wife, whom he is bringing up as a father might his child; or again, the common way of obtaining a wife, which is by conquest. The best looking women are most fought for, and the strongest man, of course, comes off victorious in the end. The old men, as the most respected ones, are always surrounded by the prettiest and youngest wives, and the young men have great difficulties and have to wait for years for their turn.

Of the education of the children there is no trace. The little ones are left to themselves, and they are allowed to do just as they like. As soon as the boy can walk he begins to play with the boomerang, and to smoke tobacco, and very soon conducts himself like a grown-up man. In mind he does not differ much from his father, for the adult Australian is really but a child in thought and deed.

To return now to cannibalism, already referred to. When the blacks do not have to keep up appearances before the whites, they make no secret of their love for human flesh. As soon as they come in communication with white men they deny it, because they see the white man, whom they always want to imitate, abhorring

human flesh, and chaffing them for this custom ; by and by they leave off the cannibalism altogether. Moreover it must not be supposed that they indulge in human flesh every day. During my whole stay at Herbert River only two blacks were killed and eaten. One of them was a young man who had ventured into the territory of another tribe and was surprised there ; the other, an old man, was not able to escape quickly enough when his tribe was attacked ; he was beaten to death with stones, and his flesh was brought to Herbert Vale in baskets.

You must not imagine the cannibals more ugly and wild-looking than other savages. Certainly, the most daring and crafty ones go hunting for men, but a man-hunter may look very quiet and sociable. The meal is shared in by both men and women.

As a rule they do not eat any of their own tribe. I know of only two cases in which members of the tribe were partaken of, and in one of these a mother joined in devouring her own child, though Australian mothers are, on the whole, exceptionally gentle and kind to their little ones. In other parts of Australia, *e. g.*, near Moreton Bay, and south of the Gulf of Carpentaria, they eat the corpses of their relatives.

Generally an expedition of four or five men sets out for a man-hunt. A small tribe is watched for a long time from an ambush, and, as soon as they think themselves safe, the pursuers, some fine morning before day-break, set upon their victims, who never dream of offering any resistance. The men run away without troubling themselves about the women, who are left to make their escape the best way they can with their children.

The Australians do not like the flesh of the white man. It causes them nausea, they told me, as I learned when they had killed a white man near my headquarters and I asked them if they had eaten him. So, although during the latter part of my stay I was often in danger of being killed, I should never have been eaten, but my corpse it was their intention to leave in *ngallo*, *i. e.*, in the river.

There is no religious idea connected with their cannibalism, but human flesh is the greatest delicacy known to them. The Australian, however, has the superstitious belief that by eating the fat around the kidneys, which they consider the centre of life, the strength of the dead man will be transmitted to themselves, and that by carrying a small piece of human fat, wrapped up in grass, upon their person, they will have luck in their hunting expeditions. Next to the kidneys the thighs are the most relished part of the human body, but they never eat the head.

As an example of the degraded condition of the Australian natives, I may here cite the following case that occurred in the neighborhood of Herbert Vale. A young lad, twenty years old, called Mangola Maggi, who had frequently accompanied me on my expeditions, and to whom I had offered some tobacco as a reward for the cranium of a black who had lately been killed in a *borboby*, brought me one day a skull. I immediately saw that the one he had brought was not that of a full-grown man, and that there was a large hole on the top of the skull. When I asked him what had caused the hole, he answered that the dingos had begun to gnaw the dead body. My people, however, declared, that it

was the skull of a black whom Mangola had killed some time before. He had asked an old man with two pretty young wives for one of them, and the old man naturally refused this request. This angered Mangola so, that to avenge himself on the old man, he slew his young son, ate him, and tried to earn some tobacco by selling the skull to me.

The Australians generally bury their dead, but they always try to avoid having the corpses come in contact with the earth, so they cover the body with bark or something similar. Pretty common is also the custom of placing the corpses between bark and leaves upon a platform, where they are kept until they are gone to decay, whereupon the bones are buried in the earth. A kind of mummies too is found in Australia, dried by fire and smoke; old warriors especially are treated in this way; and the bodies of male children are also prepared in this manner. The body is packed up into a parcel and borne around for some time, even up to six months, by the mother; she carries it along wherever she goes, and at night sleeps beside it.

They entertain a vivid fear of the spirits of their dead, particularly of those of high rank; the spirits of those dead long ago they do not fear. As a whole, these children of nature do not seem able to abstract the human soul from the body, upon the presence of which their ideas about a future life seem to depend.

Sorcerers are highly dreaded; whenever a man dies from sickness, they always ascribe it to witchcraft wrought upon them by a hostile tribe, and this superstition is very effective in upholding the hostility between the tribes.

It now only remains for me to give a brief account of their religious ideas. These are, to say the least, very limited. As every one knows, there is no trace of idol-worship among the Australians: nor has any one observed them praying or sacrificing; they confine themselves to fearing. At Herbert River they have not the faintest conception of a beneficent Supreme Being, but, on the other hand, they are afraid of an Evil Power, which may harm them; their ideas about this Evil Power are, however, extremely confused. Sometimes they see it embodied in a cicada, which, on summer evenings, makes an uncanny noise—a noise that seems to come one knows not whence. But the Evil Spirit especially manifests itself to them in a night-bird, called the Quingan. I must confess that I have never heard so dismal a voice in any bird as in this one; it always lurks in the most inaccessible mountain-districts, where it is difficult to get at it.

Of any sort of cult there are only the very faintest traces. Thus, boys when they attain manhood, are marked with two half-moon shaped marks on their breast. The wound is kept open and the scabs, before they peel off, are collected, placed in a very small basket, round his neck, and then carried into the forest and thrown away, as an offering to the Devil, evidently intended to appease his displeasure. Oddly enough, they are not, like other savage races, afraid of thunder and lightning. Of a future life they seem to have only a very vague conception. As I was once passing by a grave, over which a basket was hanging from a tree, I fancied I had come upon some dim idea of a future life; that this was perhaps a custom, as with the Indians,

who place food and drink for the departed spirit over the grave. However, I received a very simple explanation. The parents of the child who lay buried there had themselves hung up the basket, because the child had been very dear to them, and they hoped to forget their grief if only the basket, in which they had formerly carried about their little one, were out of their sight. One of the last times I was with the blacks, the full-moon rose in all her glory above the palm-wood. I asked the people in their own tongue "Who made that?" The answer was: "Other blacks." Then when I spoke to them of the sun, I received an identical answer. They are also firmly convinced that they can make rain (*milka*). When we were overtaken on any of our expeditions by one of the great tropical showers, they were invariably angered at the blacks who had sent the rain.

The missionaries have tried, particularly in the southern part of the country, to convert the blacks; with but little success, however, as they have had to combat not only the disinclination of the blacks, but also the opposition of the whites.

The blacks who have been educated outside of their tribes from their childhood may advance pretty far in civilization, and learn to read, write, count, and sing. They also very easily learn to play cards, even such a difficult game as euchre. They advance farthest in the kind of work that daily occurs at the stations. In the house the women are much used, and a couple of them are, as a rule, found at every station. They make very able waiters, but poor cooks. As shepherds and stock-men they are very capable, and sometimes excel the whites.

With their innate fondness for change they always go from one master to another, even if they have no objection to their employers.

The government of Queensland has for the protection of the colonists against the natives organized what is called "the native police." It consists of blacks from other parts of Australia, who are, of course, natural enemies of those against whom they are to be used. They are uniformed, and armed with guns, and are splendid horsemen. They are commanded by a white man, called sub-inspector, and a white sergeant. In the same degree that colonization advances, they are however done away with. They have, even up to the last year, committed many outrages upon the natives, and therefore this institution has become very unpopular.

Although the Australian may advance so far in civilization as described above, it is a characteristic fact that he never can get into an independent position. He never lays anything aside and does not know how to make money. He never learns to become a trader, and he retains, when civilized, the decided disinclination for farming so characteristic of him in his natural condition. Not even in the easily earned revenue of grazing does he understand his own interest. A living sheep is an impossibility in the camp of the blacks, not to mention that the gold of the country is only a stone for them, even if they see the greedy digger grow rich by the search of this precious metal.

"When civilized nations come into contact with barbarians, then the struggle is but short except when a dangerous climate helps the native race."

This statement of Darwin's is nowhere truer than of

the Australian blacks, whose days, so to say, are numbered. As civilization advances, their number dwindles day by day, in spite of the fact that the several governments at present do everything in their power to preserve them. When the Europeans first went to Victoria, according to one account, there were 9000 blacks, but now there are only some 750 under the protection of the Colonial Government. In the year 1881, the total number of aborigines in Australia was still about 31,700.

It would seem that the Australian blacks cannot live under civilization, and will not give up their old nomadic life. Truly, they adopt only the vices of civilized life, not its virtues and advantages. Moreover, it is only the roughest type of colonists with whom they first come into contact, and these are not likely to improve the natives in any way. They have taught the women to lead disorderly lives, and sterility is now almost universal among the more civilized tribes. In the coast districts they learn to drink brandy, while the Chinese supply them with opium. It is wonderful to see how rapidly these stimulants, especially the latter, make way with them. Occasionally, too, they are treated with the utmost cruelty by the whites—a cruelty sometimes justified by self-defence, but more often nothing but a wanton slaughter. The native police, too, has been a chief instrument in destroying the natives. It has not only killed great quantities of this unhappy people, but has also contributed greatly to their demoralization. Sometimes even arsenic has been put into their food by the settlers. Such atrocities committed upon the poor savages will ever remain a disgrace to humanity. The blacks in return commit outrages, too ; and still, in

the civilized parts, oppose the invasion of the whites into their native country.

To civilization and Christianity the Australian aboriginies have not proved susceptible, and to resist the advancing civilization is beyond their power; they remain therefore without future, without home, without hope—a doomed people. The two races cannot exist together. If natives attack the whites or their cattle, they are shot dead; if they try to be on friendly terms with the strangers, their destruction is no less certain. Taken all in all it is probable that within a few generations not a single Australian aboriginal will remain. Their fate will be that of the Tasmanians, the last of whom died some years ago; for these feebleness races must succumb to the inexorable law.

MAP OF

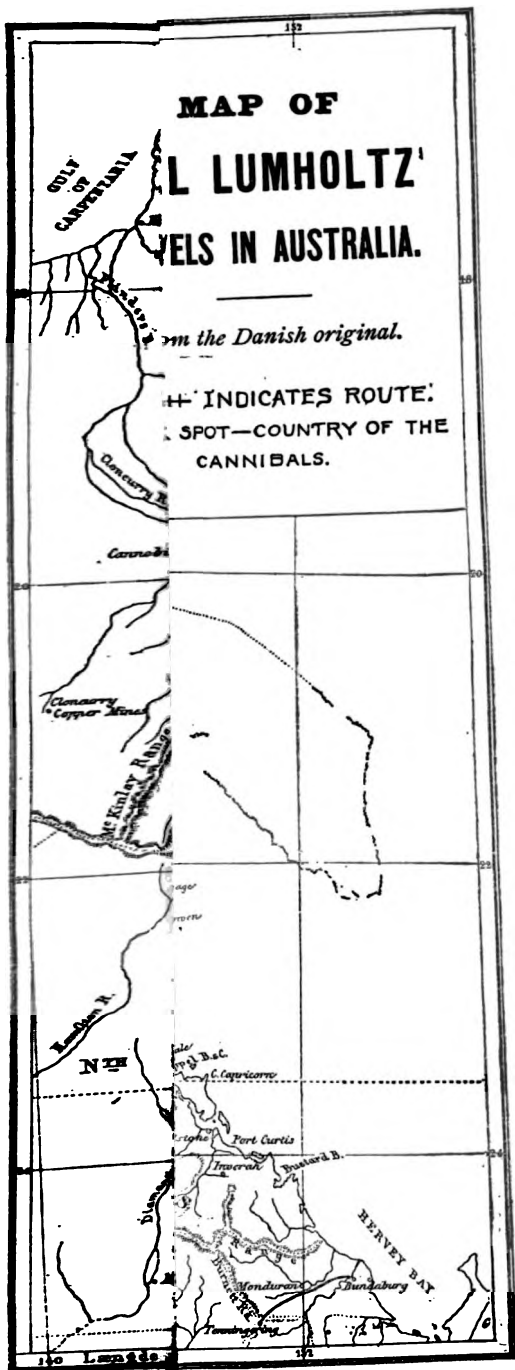
L LUMHOLTZ'

WELLS IN AUSTRALIA.

from the Danish original.

++ INDICATES ROUTE.

▲ SPOT—COUNTRY OF THE CANNIBALS.



THE PORTUGUESE IN THE TRACK OF COLUMBUS (1493.)

BY

DR. P J. J. VALENTINI.

STORY OF THE EXPEDITION.

II.

“Whoever finds this package and delivers it unopened to the Kings of Castile, will receive the sum of a thousand ducats.”

Despairing of ever bringing his broken vessel through the raging storm and waves, a ship captain rolled a cask overboard, on February 14, 1493, far off from the Azore Islands. It concealed, in waxed cloth, a well fastened package with the above inscription, and this package contained the report of the discovery of great islands in the far west of the ocean.

A second cask with the like contents was fastened on the bowsprit of the ship as a further measure of precaution.*

* With regard to the events that happened between the 14th of February and the 14th of March, as they were drawn up in the following narration, we rely on two main sources of information. First, Columbus's journal of his first voyage, in *Navarrete, Coleccion de Viajes, Tom 1, pag. 1-166*. This text, presenting only a summary of Columbus's original, was made by Las Casas. Second, *Historie del Sig. Fern. Colombo ed. Milano, 1614*, where in Chap. 36, pages 150-153, the son reports his father's adventures during those tempestuous weeks. This text is of peculiar interest because it contains a verbal abstract from Columbus's original journal. The most interesting passage runs: "et di subito feci portarmi un gran

Whither the waves carried that first memorable document of the discovery of a New World, no one knows. But only three weeks later, we see the rescued man. Christopher Columbus, run into the Tagus River with a wreck and cast anchor at the *rastelo*, the Custom-House of the port of Lisbon, (March 4, 1493.)

For weeks the same storm had raged on the coasts of Portugal, and countless wrecks had floated to land. The river was alive with ships that were prevented from running out, and among them, it is related, was King Joam's new-built giant-ship,* which loomed above the others like a floating fortress. Curious boats swarmed around the *Niña*. When she hoisted the Spanish flag, there was no longer any friendly glance of welcome in the eyes of the lookers-on.

Columbus's situation was painful, if not humiliating. Fleeing from the pressure of his creditors and perhaps still more from the ridicule of the learned men, who had condemned his problem laid before the King, he had nearly seven years before gone secretly across the border to find a better hearing from the King of Spain. How he at last succeeded in this, how he was raised to the rank of an Admiral, and was sent out into the Ocean with a fleet of discovery and with what fortunate news he turned back towards home—all this is well known. That fate should now have driven him to ask for help

Barile, et havendo involta la scrittura in una tela incerata, et messala appresso in una torta, o focaccia di cera, posila nel Barile, et ben serrato co' suoi cerchi lo gittai in Mare * * * et feci un altro legaccio simile á quello, e lo accommodai nell' alto della Poppa, accioche, sommergendosi il Naviglio si manesse il Baril sopra le onde in arbitrio della fortuna."

*A description of the Giant-Ship is given in Resende (Garcia de) Cronica del Rey Dom Joam, cap. 146.

from the very city in which his whole course of life was known, and where the multitude could point at him as a runaway and a traitor, must have been hard for him, and his feelings were expressed in the earliest official meetings.

On the following day* a boat with armed harbor police came to his ship. The leader summoned Columbus to come down to him and to take a seat in the boat, that he might be registered on shore by the proper authorities. Columbus recognized the voice of the person that spoke to him. It was Bartolomeo Diaz, the discoverer of the southern cape of Africa. Ten years before both of these men had been dreaming of discoveries, and now the dreams of both were fulfilled. But one had been compelled to content himself with the post of watchman in a harbor for his recompense, while the other had been elevated to the rank of Admiral of the oceanic fleet of their Catholic Majesties. Columbus answered Bartolomeo briefly and with pride that, as Admiral of the Kings of Castile, he had no account to render to any foreigner with or without authority. He would leave his ship only when compelled to do so by force of arms. It was then suggested that, as he was not willing to go, he might send the first officer of the ship in his place. But this request also was refused. Columbus's answer was in a like tone of insulted pride. Neither he, nor any of his crew would set foot out of the ship. It was not the habit of the Admirals of Castile to surrender themselves or their men, even at the risk of their blood.

**Navarrete C. de V.*, Tom I., pag. 162 and *Historie d. S. F. C.*, Chap. 40, pag. 163-167.

This allusion to the sailor's feeling of honor did not fail of its effect. If he were so determined, rejoined Bartolomeo, the matter might rest there. But in that case he could not help asking Columbus to give him personally a sight of his royal patent as admiral, to which he had appealed. To this request Columbus acceded. Bartolomeo went on board of the *Niña*, read the document shown to him, declared himself satisfied, and returned to the large custom-ship to report what had taken place. In accordance with ceremonial, the commandant of the port, Alvaro de Acunha, then appeared on Columbus's caravel, and amidst the noise of drums, fifes and trumpets, placed himself in the most polite manner at the disposal of the admiral for all further services.

Columbus escaped in this way a great danger. He had assured himself of the protection of the authorities, who now became the bearers of a letter which he addressed to King Joam. In it he begged the monarch, who was not then sojourning in his capital, but was at his country-seat of Val de Paraiso, for protection as "a shipwrecked guest and an admiral of the Spanish Crown." He further wrote that he did not come from Guinea or any other possession of his Portuguese Majesty; that he had reached the far west of India, and was carrying home a cargo of high value, which he feared was not very secure in his place of anchorage. The people on shore and in the ships were regarding him with suspicious looks. He begged his Majesty to allow him to leave the *rastelo* and to go up the river with his ship to the city, in which his cargo would be less exposed to danger.

This letter of Columbus to King Joam is not in existence. He gives only an abstract of it in his journal. But on the same day, the 4th of March, he dispatched another letter to Castile, addressed to King Ferdinand's ration-master, Don Luis de Santangel, which contained a summary report of his discoveries. This was the same letter * that Columbus had written at sea and had fastened to the bowsprit in a cask, fearing to lose his ship. He now dispatched the original, but not without slipping into its envelope a paper (*anima*) on which stood briefly written that he had encountered heavy weather at sea, but that he was now safe in the harbor of Lisbon. A laconic postscript, indeed, which undoubtedly gave as much thought to King Ferdinand as the important report itself.

On the following days, the 6th and 7th of March, Columbus notes in his journal that almost half Lisbon had come running out to see him, to express their astonishment, their admiration and their congratulations upon his success and wonderful return. Others, however, he writes, gave open vent to their angry feelings that the king had allowed so fair an enterprise to slip from his grasp. The Lucayan captives were particular objects of curiosity and comment.

On the 8th of March, Don Martin de Noronha, a royal chamberlain, made his appearance in the harbor. He was the bearer of an answer in the king's hand-writing, by which Columbus was courteously invited to an audience in Val de Paraíso, and to be his and the nation's

* The identity is proved by the date, which shows the 15th of February, while the postscript (*the anima*) slipped into the envelope, is dated Lisbon, 4th of March, 1493.

guest. The king, moreover, expressed his congratulations upon the admiral's fortunate arrival in his realm and near his person. He hoped that the admiral would not heave anchor before having seen him. At this point a somewhat sour remark as to the sincerity of the king's feelings slips from Columbus's pen. However,—so he continues,—* in consideration of the sworn friendship between the two kings he determined to obey the courteous summons, mainly with the hope of dispersing King Joam's suspicions that he came from his African possessions; and on the same day he started for the court. They had one night's rest in Sacavem and on the 9th of March, before noon, they reached Val de Paraiso, where a host of nobles came to meet him and lead him into the presence of the king.

We know the two had often met before. Joam, indeed had always been a gracious monarch to Columbus. He had made the poor and wandering Genoese a subject of his kingdom, had given consent to his marriage with the daughter of one of his vassals, had listened to his projects with an ear more willing and attentive than had any of the learned *junta*, never positively rejected his proposals, but always kindly asked him to wait a little, for the time had not yet come. When later and for reasons above quoted, Columbus had absented himself in Spain, Joam had requested him in the kindest manner to return, promising that all should be forgotten, and that the justices should not interfere with him, for that he would stand under the royal protection.† But Columbus had

* *Hist. d S. F. C.* pag. 163: Nel che l'Ammiraglio fù alquanto dubbioso: ma, cōsiderata l'amicitia, che tra lui, et í Re' Catolici era, e la cortesia * * * si contentò di andare á Val di Paradiso. * * *

† This letter is printed in *Navarrete*, *Tom. II.*, page 5, Num. *III.*, in its origi-

not returned, and now, just five years later we see him standing in the presence of his king as the discoverer of the longed-for Indies, but none the less a shipwrecked mariner asking for aid.

His reception on the part of the king was flattering and obliging.* Columbus had taken his cap off on

nal Portuguese text. As far as we know, no English version of it has ever appeared. Thus we give it as follows :

"To Christopher Columbus, Our special friend in Seville. Cristóbal Colon. We, Don John, by the grace of God, King of Portugal and the Algarves ; on this side and on that side of the sea in Africa ; Lord of Guinea, send you full salutation. We have seen the letter which you have written to Us : and for the good will and affection which you therein show that you entertain for Our service We thank you heartily.

And as for your coming hither, be assured, that as well for that which you mention as for other matters in which your skill and intelligence will be essential to Us, We desire it, and with great pleasure see it, because in what regards you such order shall be taken that you may be content. And because you may be under some apprehension of Our Courts by reason of some obligations by which you may be bound, We by this Our letter give you assurance for your coming and stay and return that you are not to be arrested, nor detained, nor accused, nor cited, nor sued, civilly or criminally, for anything of whatsoever nature.

And by these presents We charge all Our magistrates to do this Our will. And so We beg you and recommend that your coming be speedy, and that you feel no embarrassment with regard to it : and We hold it for a pleasure to Us, and shall take it as a service.

Done at Avis the twentieth of March, One Thousand Four Hundred and Eighty-Eight.—

THE KING."

No statement can be found in the authors as to whether or not Columbus availed himself of so gracious an invitation. It is far more probable that he did not go. At the time when he wrote to King Joam, he was already deeply engaged with the Kings of Castile, as well as with some Grandees, who had favored his scheme and had supported him with money. An engagement of another nature may have prevented him from leaving Cordova. Doña Beatriz Enriquez de Arana was expecting about this time the birth of Fernando and must have prevailed upon Columbus not to leave her, the fear weighing upon her mind that he might remain in Portugal where he had been living in wedlock with the mother of Don Diego, and that the King Joam would induce him to remain there.

*No author gives a more detailed description of the three audiences with King Joam at Val de Paraiso, than Columbus himself. See *Navarrete, Tom. I., page 1-175. Journal of First Voyage*, and dates March, 9th, 10th and 11th—Fernando, in

entering the hall, but the king bade him to cover his head and be seated by him. All stood in watchful expectation of the turn this audience would take. Providence itself, such was the undisguised feeling of those present, had shown its hand by bringing a traitor back and placing him before the tribunal of his temporal judge.

The king asked Columbus to narrate the details and adventures of his voyage. He did as bidden, and with this the audience would have been at an end. Only when rising the king could not refrain from making the remark that although he was willing to oblige the king of Castile in all his desires, he nevertheless was of the opinion that this voyage of the admiral toward the west had been made contrary to the stipulations agreed upon between the kings a few years ago, and that the newly-discovered islands, accordingly, were his possession. Somewhat more than straightforward was Columbus's answer. "I have but obeyed orders to sail. I did not touch Guinea nor the fort of la Mina and I have faithfully carried out my instructions." "It is well," retorted the king, "it is not my habit to treat such matters with a third person." These words were the signal of dismissal.

That night Columbus was the guest of Don Diego

his *Historie*, ut sup. follows his father's text almost *verbatim*. As to the Portuguese writers they confine themselves to speaking of Columbus's undeserved good luck and the indignation aroused by his overbearing remark made to the king. To quote only *De Barros, Decada primeira da Asia, Tom. I., Livro 3, Cap. XI.* fol. 56; (Lisboa, 1628).—"E porque Colon fallava maiores grandezas, e cousas da terra do que nella hauia, e isto com huma soltura de palavras, accusando, e reprehendendo a El Rey em naõ acceptar sua offerta: indignou tanto esta maneira de fallar a alguns fidalgos, que ajuntando este avorrecimento de sua soltura, com a mágoa que viam ter a El Rey de perder aquella empreza, offerecêram-se delles que o queriam matar, y com isto se evitaria ir este homem a Castella."—

de Almeida, the prior of Crato and the king's intimate friend, by whom he was entertained with the utmost courtesy. On Sunday, the 10th of March, after mass, Columbus was again summoned to an audience before Joam. The subject of the conversation on the previous day had been merely confined to the voyage and to the personal adventures connected therewith. This day a discussion was opened. Those assembled took part in it, and they made it hard for Columbus. He was asked questions which, for motives of discretion, should have been suppressed, but which on the other hand he was not able to evade. For instance, doubts were very cunningly expressed to him of his having been in the Indies at all. It was pointed out to him that, starting from Castile, no one could reach the Indies in a voyage of but thirty-three days. No minutes of this interesting audience are extant, but from the general reports on record it is natural to conclude that, in order to satisfy themselves, Columbus's examiners requested him to point out to them his sailing course, to give them some account of the winds and currents he had met with, of the degrees of latitude and longitude in his day's reckoning, and of the size and position of the islands discovered. Undoubtedly his impression must have been that he stood before a set of inquisitors who, under the veil of an excited curiosity, were eagerly bent on snatching from him the secret of his wonderful passage, and of the very location of those islands in the far west. But, on the other hand, there was no reason why he should not satisfy these envious inquisitors. He could endure the pressure ; for, was it not in the name of the King of Castile that he had solemnly taken possession

of the islands, and was he not certain that this possession would be maintained and defended? Nor did he fail to exhibit on this occasion the products brought home from the Indian soil. He showed to the assemblage the pepper that he had gathered in Cuba, the cinnamon bark from the Bahamas, the golden ornaments procured from the Caribs and Lucayans, and, as a final proof that he had indeed been in India, the Lucayan captives were led into the hall. Up to this time the king is said to have indulged in spicing his doubts and questions with the salt of humor and slight sarcasm. His mood changed at the first glance cast upon the Indians. His countenance grew pale and serious. He exclaimed: "No, indeed, these are not my people of the Guinea coast. Their color is black, their hair is woolly. These have the light complexion of the people of India, as I have been told. Only look, how straight is their hair!"

It may have been at this moment that, as we are told, the imprudent remark escaped the lips of Columbus: "Indeed, had your Majesty only shown me more confidence and lent an ear to my proposals some years ago, the King of Portugal would now be the ruler of India." These words aroused a storm of indignation in the assemblage that found echo in the whole nation.

When the audience was ended, some cavaliers of the Court approached the king with a proposal to remove the foul slanderer at once, in one way or another, on his return to the harbor. The great secret, they said, ought to be buried with the man himself. The plot met, however, with the most serious disapproval of the king.

There then followed a third and last audience, with which Columbus took his farewell of the king. He could not, however, refuse to accept an invitation on the part of the queen Leonor, who had expressed her wish to meet him in the Convent of San Antonio. There Columbus saw her in company with her brother Emanuel* and the Marquis Don Jorge, both belonging to the household of the queen. So it seems that not without wise forethought, care was taken that every prominent personage of the kingdom was given a chance to hear from the lips of the remarkable adventurer himself the story of his expedition. Witnesses and testimony were to be gathered, and the perfidious infraction of the treaties laid before the Cortes, in whose hands the decision as to the final measures rested.

The cavalier Don Martin de Noronha was Columbus's inseparable companion on the way back to the harbor. When they arrived at the *rastelo*, they were overtaken by another cavalier to offer Columbus saddle-horses for his return to Castile. Of course Columbus declined the courteous offer and shut his eyes when one hundred ducats, as a present from the king, were slipped into the hand of the first mate of the Niña.

One of the admiral's last acts in Lisbon was to despatch a letter to Don Rafael de Sanchez,† who was

* Columbus (Journal, March ii,) speaks only of the "*duque y el marqués*." If we consult *H. Schaefer, Gesch. v. Portugall (in Gesch. d. Europ. St., Heeren und Ukert) Vol. II., pag. 655, sqq.* it will become evident that by the first was meant Don Emanuel, the Duque de Braganza e Conde de Beja, the only survivor of the four brothers of Queen Leonor, and by the other, King Joam's illegitimate son, Don Jorge, as he was called by the people, both having been attached by the king to the queen's household.

† This letter is printed in *Navarrete, Tom. I., pag. 178-197*, with a version in Latin, the translator being Leandro Cosco, Roma, 1493. In this Latin shape, as

the ration-master of the Kings of Castile. This letter is dated 13th of March, 1493, but no mention is made in it of the stay in Lisbon, nor of the audiences with the King of Portugal. It is a mere copy of that previously sent to Don Luis de Santangel. Columbus soon after weighed anchor, and we do not hear of him prior to the date of March 31, when, amid the enthusiastic cheers of the whole populace, he made his entrance into Seville. Thence he hastened to Barcelona, where King Ferdinand was holding his Court.

The first great affair of state planned in this city was to obtain the papal confirmation of the possession of the new islands, and a permit for further discoveries to be made in the same direction. How quickly Ferdinand's messengers accomplished their journey is shown by the date of the Bull, Rome, the 4th of May.

Meanwhile, those in Lisbon were not inactive, for immediately after Columbus left the Tagus River, the deeply-mortified king summoned his Cortes to assemble

is known, the letter made the round of Europe and conveyed to the learned world for the first time the knowledge of the discoveries in the West. The Spanish text, taken sentence by sentence, is in substance identical with Columbus's letter addressed from Lisbon on the 4th of March, to Luis de Santangel. In wording, however, this Sanchez-letter differs materially from the one to Santangel, in which we have the words as they were put down originally by the discoverer, while the Sanchez-letter must be regarded as a paraphrase. It is couched in such an elegant Castilian as Columbus never was able to write. Containing, as the letter does, news so important and so closely connected with the glory of the king and the nation, it was well thought of in the publisher to present the document in a finished and attractive style. Upon comparing the two texts it will be found that the Sanchez-letter mentions two islands more than those named in the Santangel-letter, *i. e.*, *Matinino* and *Caris*. In this the paraphrase appears to be more correct than the original, in which either the copyist or the printer read "*matrimonio*" instead of *Matinino*, and omitted the "*Island of Caris*," from the place in which Columbus must have mentioned the name when speaking of the habits of the Lucayan Caribs. On the other hand, the reader is surprised to find the *legua* computed at three *millas*, four of these being generally reckoned as equivalent to one *legua*.

in Torres Vedras. Vengeance was to be taken and war to be declared. There must have been many doubts and varying opinions as to how the purpose could be accomplished, and whether Portugal could make head against the powerful monarch beyond the Guadiana. Yet, even then there was a fleet lying at anchor in the Island of Madeira ready to start for an expedition along the African coast. Nothing, therefore, was easier than to acquaint the commander, Don Francisco de Almeida,* with the suggestions and facts so deftly gathered from the Castilian admiral, to send ships in the track of his course, and, if necessary, to fight out the duel at sea for the possession of India. This was the verdict of the people, for they felt and knew that they were masters on the water. Yet there was still another party. They wished to wage the war on land. They longed to have the throne of Castile occupied by Juana, the legitimate successor to her father, the King Henrique of Castile, since it was by mere trickery that she had been superseded by her cousin Isabel, the consort of Ferdinand. The unfortunate lady had found refuge in Portugal, and it was rumored that King Joam, on the road to Torres Vedras, had stopped at her residence and had had a long interview with her. It was further ru-

* This is the name of the presumed commander of the expedition, as it is given by the Portuguese historians. It is confirmed by the author of the *Annaes da Marinha Portuguesa*, Sr. Dom Ignacio da Costa Quintella, Lisboa, 1839, where, in the chapter of Reinado del Rei Don Manuel, and on page 222, he says: "Em consequencia deste parecer mandou armar huma Esquadra, de que nomeu Comandante en Chefe a Don Francisco de Almeida, filho do Conde de Abrantes." On comparing *Barros*, Tom. ii., Dec. 2, libro 3, cap. x, fol. 77 and 78, it will be found that the famous conqueror of the Indies and the commander of the West Indian caravels must have been one and the same person: "Foi dō Francisco d'Almeida filho septimo de dō Lopo d'Almeida, primeiro Conde de Abrantes (fol. 77), and "foi dō Diogo d'Almeida, Prior do Crato, seu irmam" (fol. 78).

mored that the king's intention was to draw the princess from the obscurity in which she lived, to bring her before the public eye, and set ablaze again the old war of succession.*

The Cortes assembled in Torres Vedras resolved, however, to follow the great current of national feeling. Upon presentation of the matter the king said that he did not care at all for his relationship to the kings of Castile. It was not a personal affair of his, but that of his vassals, and the whole nation whose honor he had sworn to protect, and who for long years had always considered themselves to be the born rulers of the ocean. By the Bull of 1438 Pope Eugene had settled the boundaries of Castile's dominion in the ocean. In conformity with this no Spanish vessel was allowed to pass the line of the Canaries to the south, and distinct pledges had been given to him on this subject by King Ferdinand before the sailing of Columbus's expedition. Hence, as the Castilian admiral had evidently sailed beyond the boundary line, and as he had found new islands there, these new islands, so he considered, belonged to him and to his people. He was resolved to stand by his right and fight for it.†

The deliberations of the Cortes resulted in a proclamation to the effect that steps had been taken to settle

* On the adventures of this unfortunate princess read *Schaefer, Gesch. v. Port. Vol. II., pag. 580-83*. Special mention of this circumstance is made by a well-informed Portuguese historian, *Damião Antonio de Lemos, Faria y Castro, Hist. geral de Portugal, 20 vols., Lisboa, 1787*. In vol. 8, page 212, he says: "Visita en el camino a D^a Joanna, presumtiva herdeira de Hespanha. Esta marcha repentina e visita não esperada fizéram nascer o rumor, de que El-Rei determinava inquietar os de Castella, e tirar D. Joanna ao theatro para pretextar o rompimento." * * *

† De Lemos (as above). page 212 * * * glória, que elle entendia reservada só para os seus vasallos, tão conhecidos entam por unicos dominantes dos mares.

the affair in a peremptory way with the King of Castile. On the sixth of April, a royal messenger, in the person of Don Ruy de Saude, was dispatched to make Ferdinand acquainted with the temper and feeling of his aggrieved neighbor. This mission of Saude, to quote the words of our authority,* was meant only to withdraw attention from Joam's bellicose proclamation and the expedition he had sent out in the track of Columbus's western discoveries. We learn from the same source† that in the letter written by Joam he expressed to Ferdinand the joy he felt at the news of Columbus's success, and his satisfaction that the admiral had kept the line of the Canaries and had not gone to the South: "Now, as his royal brother undoubtedly has the intention to follow up his new discoveries, he had resolved to beseech him, most urgently, to order the Castilian admiral to keep the line of the Canaries. For if he (Joam) on his part, should also resolve to send ships of discovery, he would give orders to his captains, under the most severe penalty, not to cross the line to the north. It was only under such conditions that the right and the property of both would be preserved."

It can hardly be imagined that King Joam could have asserted his rights with more firmness and at the same time have declared his understood intentions more art-

* See Geronimo Çurita, *Anales de Aragon, Hist. d. Rey Don Hernando el Catolico, Çaragoça, 1670, Tom. 5, pag. 30 sqq.*—"porque con este color dissimuló lo de la empresa, que se publicó que queria seguir en el mismo descubrimiento de Colon."

† Çurita, *as above.*—One cannot read Çurita on this subject without gaining the conviction that he had access to the whole of the official correspondence exchanged between the two kings, and now no longer within reach. Although he is not so positive and explicit about the dispatch of Portuguese ships on the track of Columbus as we shall see that King Ferdinand was, he takes the whole affair for granted, and so do de Barros and the rest of the Portuguese chroniclers.

fully than in the words quoted. His heart must have burned with anger to see his ocean-kingdom invaded by his powerful neighbor. He expresses himself however as if Fernando were rather welcome to continue the discoveries. He does not directly threaten to seize Ferdinand's ships should they be found south of the dividing line. He puts it indirectly, that he would pitilessly punish his own captains should they be found north of the line in Ferdinand's waters. Joam was thoroughly convinced of the trespass of Columbus, but he does not in any way refer to it, when speaking of him. On the contrary he only praises his accuracy and congratulates Ferdinand upon having so capable a subject.

Notwithstanding the speed with which Saude travelled, rumors preceded him to Castile of naval preparations made in Portugal with the object of seizing the islands. King Ferdinand, alarmed by these rumors, hastened to send to Lisbon, even before Saude's appearance at the Court, one of his most trusted councillors, Don Lope de Herrera. Herrera was the bearer of two royal missives. One of these was to be handed to Joam, if the envoy on his arrival was convinced that no warlike preparations were going on in Portugal and that no ships had been sent out to the West. The same missive also contained Ferdinand's thanks for the good reception which Joam had given to Columbus, and an entreaty to avoid the difficulties certain to arise if ships had been sent to take possession of his new territories. Since he and his predecessors had always taken the greatest care to respect Portugal's discoveries along the coast of Africa, he might fairly expect the same consideration from Joam in the present instance. The other missive Herrera

was bound to present should he observe that Portugal was bent on war. This second letter contained a curt summons to stop preparations; failing which, it would be left to war to decide between the two kingdoms.*

It seems that Herrera on reaching Lisbon did not get the impression that Portugal was busy with preparations for war. As for the fleet, which was stationed, not at Lisbon but at Madeira, little could be learned, for the admiralty kept its own counsel with regard to its plans and the destination of the ships.†

Rumors as to the dispatch of vessels had been afloat before and must have reached Herrera when at Lisbon, but he was not able to get at the facts, which gave rise to the rumors. It is therefore probable that he resolved to present the first of the missives, and of this story corroboration will be found in a letter written by King Ferdinand to Columbus, who then resided in Cordova.‡ This letter expresses confidence in the preservation of

* *Çurita*, as above: * * * "que si el Rey de Portugal hubiese embiado o quisiese embiar à las islas, no se le diese *esta carta*—sino solo *una de creencia*, para requirirle con mas aspereza—y que lo mandase pregonar en su reino."

† It had been for years the policy of the Crown of Portugal to spread a thick veil over all its Oceanic expeditions. In order to keep these out of sight of foreign spies, the Royal Naval Station had been removed to the port of the Island of Madeira. The assembling of the fleet and its waiting for orders to sail, just at this time, is attested unanimously by all contemporary writers. Compare on this subject *Dr. Heinrich Schaefer's* master work, *Geschichte von Portugal, in Geschichte der Europ. Staaten von Heeren und Uhert, Hamburg, 1836-1854*, 5 volumes, and especially *Vol. iii.*, page 67, sqq.

‡ *Col. de Documentos inéditos, Madrid, 1878, Tom. 30, pag. 171.* El Rey e la Reyna á Don Cristóbal Colon, Barcelona, Xunio 12, 1493. * * * Agora vino á nos Herrera, nuestro mensaxero, el que abiamos ymbiado al Rey de *Portugal* sobre las carabelas que nos descian que ymbiaba a las dichas yslas e Tierras Nuestras descubiertas e por descubrir * * * e para que se declare esto, disce que imbiara a nos, sus mensaxeros, los cuales aun no son venidos, e fasta que vengan, disce que no ha ymbiado nin ymbiará navios algvnos.

peace. It says: "Herrera has just arrived here. You know we sent him to the King of Portugal on account of those caravels, rumors of the dispatch of which to the islands of your discovery had come to our ears. The answer we have received is well-worded and gives us satisfaction. It seems that the king's intentions are in full conformity with ours, which are that each of us shall keep that which belongs to him. And in order to come to an understanding, he says that he will send to us ambassadors, who have not yet arrived, and he also says that before their arrival he has not sent, nor will he send, ships to the West. You shall learn of all this in time. As to your departure, make haste and observe economy; notify us also of all you hear from Portugal." . . .

Columbus's sailing had been fixed for the 15th of August. The preparations had been made on the grandest scale. Not only were the new islands to be peopled with colonists, and the latter to be furnished with provisions until a crop had made them self-supporting, but care was also taken to protect them as well as the vessels against any attack at the hands of the Portuguese.

The whole month of July passed and neither King Joam's messengers nor the Pope's promised Bull had arrived in Castile. It was not till the first week of August that the papal confirmation came to the hands of King Ferdinand.* We translate the words with which he sends a copy of this Bull to Columbus. "Barcelona, August 4, 1493. The Bull concerning the islands and countries which you discovered and are to

* *Doc. Inéditos, Tom. 30, pag. 194.*

explore still further, has just arrived here. We send you an authorized copy and translation of it to be promulgated there so that everybody may become acquainted with it as well as with my will, that no one without my special permission is allowed to go thither. Take this copy with you on board. For, should you be compelled to enter any port of any country, you may show it to attest your authority. We are still in expectation of King Joam's messengers. . . . Do not forget to send us the promised sailing chart,"

Columbus's ships were not ready to sail by the 15th of August. It was not before the 27th of September that he was able to weigh anchor. In these six weeks of delay various events occurred which, in our judgment, cast a flood of light upon the problem of our chart, and we call attention to some interesting points of the correspondence between Ferdinand and Columbus. The king writes from Barcelona, 18th of August, 1493 :* "As to what was written to you about the King of Portugal concerning his dispatching a caravel from the island of Madeira, and as to your offer to give chase, you have my full consent to do so ; but you will take care not to allow the ships you intend to select for such a purpose to touch at Guinea or the port of La Mina, for they are in the domain of Portugal. . . The embassy has now arrived here, but has not yet been presented to me. I trust that they will approach us in the spirit of justice and reason, for this is all we ask and wish. Should the King of Portugal, however, have prepared a fleet to sail on your course, do not be troubled. All this will be settled, and well settled, with

* *Doc. Intéditos, Tom. 30, pag. 202.*

the help of God. Therefore, do not tarry, but leave as soon as possible. Do not keep too near the coast of Portugal, else they will see you and sail after you."

This letter is followed by another: "Barcelona, 5th of September, 1493.* "You will remember our letter, in which we told you that the King of Portugal sent messengers to us to confer on the subject reported to him through Lope de Herrera, which was that we would not allow anybody to sail to those parts which are ours. We had a long conference with those gentlemen on this affair, and it almost seems as if no agreement can be reached. They now know plainly what we want, and tell us that they wish to be furnished with new instructions from their sovereign. . . Make haste and sail as soon as possible. . . Avoid the Cape of St Vincent and the whole coast of Portugal. They must not learn your course. . . And now, as to what you wrote us some months ago about the news you had from Portugal, that a caravel had left Madeira to go to the islands and to parts whither the Portuguese never had gone before, *the messengers pretend that he who sailed in that caravel did so without the orders of the King of Portugal, and that the king sent three caravels after him to seize him.* Now,

* *Doc. Inéditos. Tom. 30, pag. 211, 212 and 213 . . .* "los quales (mensajeros) vinieron aqui, e con ellos se ha mucho platicado en el negocio, e creemos que no se podrá concertar, porque ellos vienen informados de lo que Nuestro, e creemos que quieren consultar con el Rey de Portugal. * * * E porque ya sabeis que nos escribisteis que abiades sabido que de la isla de Madera era partida *una carabela* a descubrir ysla o tierra a otras partes que non an ydo los Portugueses fasta aqui, y estos mensajeros del Rey Nos dicen que aquel que fué en la carabela lo fizo sin mandamiento del Rey de Portugal, *e quel Rey abia ymbiado en pos del otras tres carabelas para lo tomar, e podria ser questo se ficiese con otro respecto, o que los mis mos que fueron en las carabelas, unas o otras querrian descubrir algo en lo que pertenescie d Nos, por ende nos mandamos.* * * *

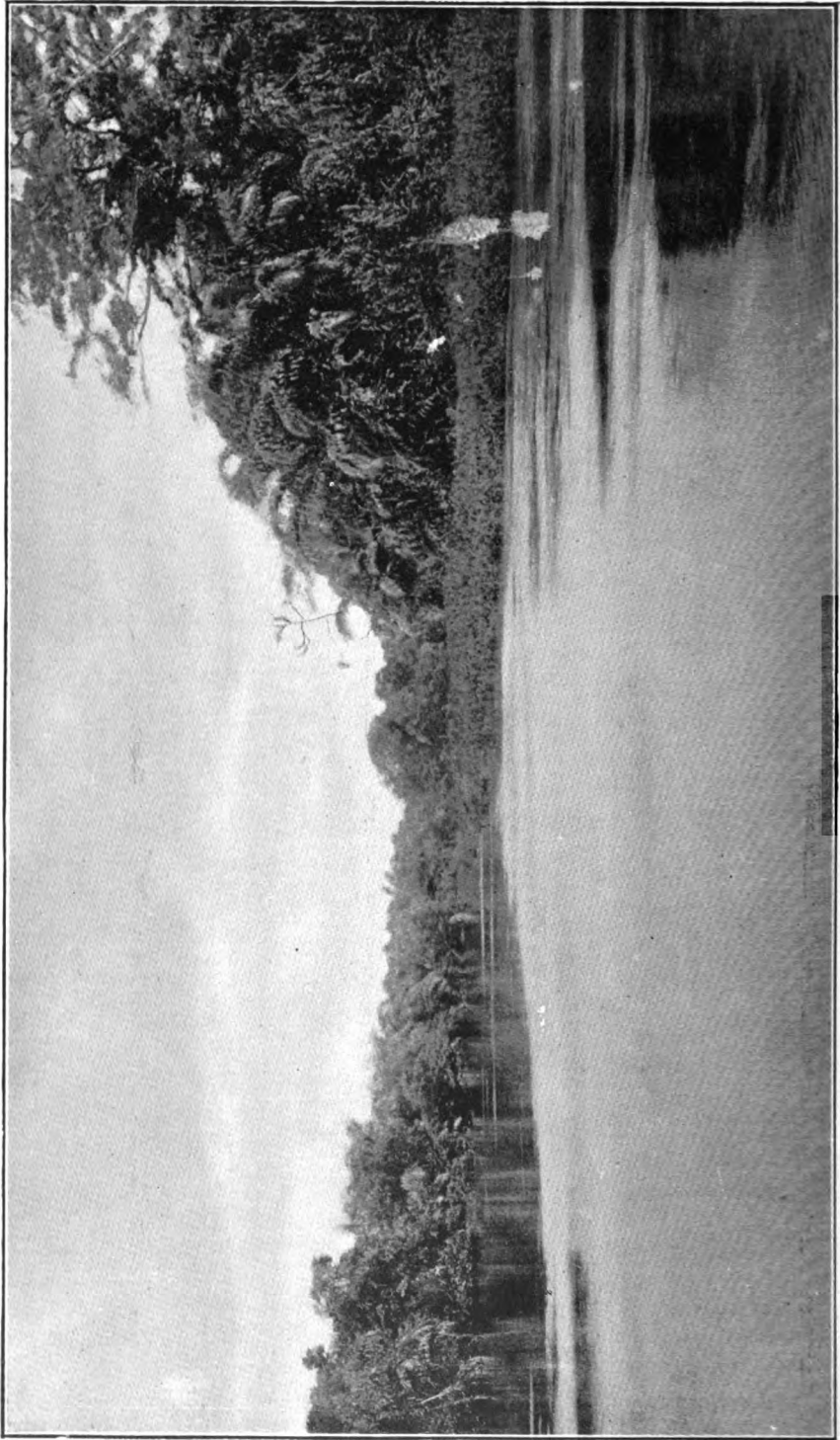
what other object can this have had than that the three should join the first, and all the four together sail in search of those parts and islands which belong to us? Therefore, we order you to attend to this affair, and with much zeal, and to provide that neither these nor any other caravels that may be further sent out with like intentions, shall be found making discoveries within the reach of our boundaries, and which are best known to you. For, although we do not despair of there still being a chance to come to an agreement with the King of Portugal, it is but reasonable, and we shall insist on it, that those who have dared to enter our possessions shall be severely punished, and ships and crews be seized. Moreover, the same messengers express to us the belief that there might be islands and mainland lying between the Cape of Africa and that line which you wanted to have drawn in the Bull of the Pope. Now, as in our opinion you must know more about this than any other man, we wish you to provide us with information on this point; for, should you be really of the same opinion as they, we might possibly find it convenient to ask for an alteration of the Bull in this regard. . . Do not forget to send us your sailing chart, and the map you promised to make, as well as the number and the names of the islands which you discovered."

It is to be regretted that Columbus's side of this correspondence with King Ferdinand is not preserved or at least has not yet come to light. At the same time that of the king alone appears to us sufficient. For his communications to Columbus furnish the *formal confession* on the part of the Portuguese ambassadors that four caravels had sailed from Madeira to the west in the track of Col-

umbus's discoveries. The whole manœuvre had been managed with great adroitness and secrecy, yet it did not escape the vigilance of Columbus's friends and the spies of Ferdinand. The king must also have been possessed of positive evidence as to the dispatch of the caravels and must have laid it under the eyes of the ambassadors. Hardly otherwise would they have confessed the fact; and we must admire the sagacity with which the monarch penetrated the specious disguise of the envoys.

Regarding the despatch of the caravels as a matter beyond doubt our chart affords evidence of a very strong character that they arrived also at *a point farther west than that reached by Columbus*, and returned, bringing with them a report and the picture of what they had found.





SAN JUANILLO RIVER

THE RIO SAN JUAN DE NICARAGUA.*

BY

CIVIL ENGINEER R. E. PEARY, U. S. N.

Two thousand miles from New York Harbor, and eight hundred miles southwest from a steamer rounding the eastern end of Cuba, there empties into the Caribbean Sea a river which, from its physical characteristics, its history and associations, and its inevitable future, is unique among the rivers of this hemisphere; the Rio San Juan de Nicaragua.

That Nicarao, Diriangen, and the other caciques whom Avila in 1522 found reigning west of Lake Cocibolca (Nicaragua) were aware of the existence of this river seems probable; but that there were ever villages along its banks or that these chiefs knew more about it than the vaguest rumors, is very doubtful.

Even after its discovery, the absence of history's mordants, gold and blood, has left the story of the river for years scarcely less vague and uncertain than before.

When Columbus in his fourth and last voyage doubled Cape Gracias á Dios, on the 14th of September, 1503, he sailed directly south along the coast, about sixty-two

* Not having had time or opportunities for access to original documents, the historical notes in the following paper are drawn principally from Lévy's "Nicaragua," Squier's "Nicaragua," and Irving's "Voyages of Columbus."

The remainder of the paper and the charts are based upon the work of the various Government Expeditions from 1871-1884, and the writer's personal experience in the Expeditions of 1884-85 and 1887-88.

R. E. P.

leagues, and on September 16th anchored near a copious river. A boat sent in for wood and water was swamped on the bar when returning to the ship and lost with all on board. In memory of this event Columbus named the river Rio del Desastre.

Leaving this river he continued for several days along the coast, until on the 25th of September, with his ships nearly disabled by storms, he anchored between a small island and the mainland in a delightful and commodious situation. "Immediately opposite, at a short league's distance was an Indian village, Cariari, on the bank of a beautiful river. The country around was finely diversified by noble hills and forests, with trees of such height that Las Casas says they appeared to reach the skies."*

October 5th the fleet left Cariari, and after sailing twenty-two leagues to the eastward entered Almirante Bay at the western extremity of Chiriquí Lagoon. Both Cape Gracias á Dios and Almirante Bay retain their names to the present day and are well-known places.

The intermediate localities above mentioned are doubtful.

Twenty-two leagues northwesterly from Almirante Bay falls very near to Port Limon, Costa Rica, and sixty-two leagues south of Cape Gracias á Dios brings us about half way between the mouth of Bluefield River and Monkey Point. Between the points thus located is a stretch of coast one hundred and ten miles in length. Some writers have supposed the Rio del Desastre and the San Juan to be the same. Lévy however considers the Rio Grande de Matagalpa to be the Rio del Desastre, and places Cariari at the mouth of the Rio Rama.

* Irving's Voyages of Columbus.

This last theory makes two circumstances difficult of explanation.

1. How so acute an observer and skilful a navigator as Columbus, could have failed during the nine days of storm, which on the above assumption he must have passed off the coast between the Rio Grande and the Rio Rama, to discover and run into some one of the numerous sheltered lagoons which extend along this entire portion of the coast.

2. How the same skilful navigator could have made so gross a mistake as to estimate one hundred and sixty miles at twenty-two leagues.

It is much easier to imagine that before a favorable wind and aided by the doubtless undetected southerly current which runs along that coast, he would underestimate his progress after leaving Cape Gracias á Dios, forty miles in a total distance of two hundred and fifty, particularly if, as was doubtless the case, his was dead reckoning.

This last hypothesis would make the Rio del Desastre and the San Juan the same, and would locate the nine days of tempest off the coast between the mouth of the San Juan and Port Limon, which seems more probable.

The copious flood mentioned would, on the whole, rather point to the San Juan, while the absence of any mention of a harbor at the mouth of the river would not militate against the theory, as it is by no means certain that the harbor of San Juan del Norte, or Greytown, is not a formation since the time of Columbus.

On this hypothesis Columbus was the first European to look upon the waters of the grand Rio.

If, on the contrary, we assume Columbus's estimates of distance as correct, then we are forced to the conclusion that the honor belongs to another.

Gil Gonzales de Avila, the discoverer of Nicaragua, supposed that the Lagoon Cocibolca (Lake Nicaragua) discharged into the North Sea. He, however, was prevented from deciding the question by a war then in progress between some of the native chiefs.

About 1528 Martin Estete partially explored the outlet of Lake Nicaragua, and named it the Rio San Juan. Estete, however, was unable to pass the rapids, as the river was very low.

In 1529 Diego Machuca, a resident of Granada, built boats upon Lake Nicaragua, and after circumnavigating the lake, descended its outlet to San Juan. He passed the rapids which had stopped Estete the previous year, reached the Atlantic with the same vessel in which he had weighed anchor at Granada, and then sailed along the coast to Nombre de Dios.

Oviedo, writing in 1540 of this exploration, states that Machuca advanced by land at the head of two hundred men, taking the same course as the boats. Machuca gave his name to the rapids in the river, and gave the name of San Juan de las Perlas to the port which he found at the mouth of the river.

In 1551 the historian Gómara indicated the Rio San Juan and the Lake of Nicaragua as one of the most practicable routes for water communication between the North and South Seas.

In 1570 the commerce of Central America was carried on by the South Sea, the pirates permitting no navigation of the North Sea except from the ports of

Vera Cruz or Cartagena, from whence ships sailed convoyed by vessels of war. But in 1579 the pirates penetrated into the South Sea also, through the Straits of Magellan, and in 1583 Realejo was fortified in expectation of an attack.

Commerce then found an outlet by way of the Nicaragua Lake and the Rio San Juan and waiting in the lower river until the coast was clear, the vessels sallied forth and kept along the shore to Nombre de Dios or Cartagena. Granada thus acquired a great supremacy in the internal commerce of Central America. The resulting prosperity, which drew upon the city many misfortunes, reached its climax in 1592. Vessels of eighty to one hundred and twenty tons, and some even larger, plied between Granada and Nombre de Dios, Havana, and Cadiz. This rich traffic could not fail to attract the attention of the rapacious and ever-alert pirates. For a long time they threatened to ascend the river to the lake, and finally, in 1665, a party under Davis succeeded in doing so, and captured San Carlos and Granada. Immediately after their retreat a redoubt was erected at Santa Cruz, now Castillo, and another at Toro, and, in addition, these two already difficult passages were ordered to be still further obstructed with rocks. Other defensive works were erected along the river, but in 1670 the pirate Gallardillo penetrated to the lake in spite of all resistance, dispersed the inhabitants of the settlement behind the fort at San Carlos, and devastated several settlements along the shore.

Then was ordered the construction of a castle at the rapids at Santa Cruz, which upon the completion of the work was called the Rapids of Castillo. At the

same time some dozen fortified stations were established along the river ; and the channel of the Colorado at the place where it leaves the main river was widened in order to diminish the quantity of water which passed through the San Juan.

The river was now so well fortified that the pirates could no longer ascend it, but that did not prevent them from watching its mouths. The current of commerce was interrupted, and the prosperity of Granada began to decline. The capture of the city by L'Olonnais, in 1685, gave it its death blow.

In 1769, the English entered the river, but were unable to ascend beyond Castillo. In the attack upon the fort the Commandant Herrera was killed, but his daughter, a señorita of eighteen years, took command and repulsed the attacking force.

In 1780, another English expedition of two hundred men, under Polson and Nelson, moved up the river and captured Ft. Castillo.

In 1796, the port of San Juan, at the mouth of the river, was made a port of entry by royal order of the King of Spain.

Thirteen years later, in 1809, there appeared in Madrid, in the *Portulano de la Setentrional*, the first published map of the port, of which we have any knowledge.

In 1832, a French survey of the harbor was made.

In 1848, a third English expedition ascended the San Juan to the mouth of the Sarapiquí and dislodged a Nicaraguan force there.

In 1850-51, the first scientific survey of the river was made by Childs.

In 1851, an American company began running steamers from the mouth of the river up to and across the Lake, and in the next few years carried thousands of passengers and large quantities of treasure across the Isthmus. The construction of the Panama R. R. drew all the passenger traffic away, but with some interruptions and various changes of owners, steamers have been running from the harbor of San Juan to ports on the Lake up to the present time. There is now plying upon Lake Nicaragua a twin-screw steamer capable of carrying one hundred and fifty tons, which steamed from Wilmington, Del., where she was built, up the San Juan to the Lake.

Since Childs's survey the river has been repeatedly surveyed in connection with the interoceanic problem, until now there is hardly a river in the United States of which we have more accurate knowledge.

To those fond of analogies the San Juan and its lakes present a very striking counterpart in miniature of the St. Lawrence and its lakes.

The physical peculiarities of this river and its basin, have naturally led to various theories as to their causes. The most interesting one is that the Lakes Nicaragua and Managua and the San Juan occupy the lowest portions of the elevated bed of what was once a broad strait stretching N. W. and S. E. between the two oceans. This is given by Lévy, but whether it originated with him or not I am unable to say.

Whether this theory be true or not only a thorough study of the comparatively unknown geology of the country can determine ; but plausible it certainly is as one cannot fail to admit who stands upon the roof of the Cathe-

dral of Leon and sees the great plain of Leon spreading like a floor from Lake Managua to the Pacific, then traverses the two Lakes and the Rio San Juan to the mouth of the San Carlos, and from an elevation of a thousand feet at this point looks E. and S. E. to the Caribbean across forty miles of forest, level as a floor, covering a V-shaped section of low swampy country once evidently an arm of the sea, now besprinkled with lagoons and intersected by tortuous, sluggish streams. Previous to this elevation of the land the waves of the Caribbean doubtless beat against the bases of the San Carlos mountains, and the spurs that come to the north bank of the San Juan from the Rio San Carlos to the San Juanillo.

The *embouchure* of the San Juan is at the northwestern extremity of a stretch of coast one hundred and fifty miles long, which forms the bottom of the Gulf of Veragua, and lies in an almost straight line perpendicular to the constant rush of the northeast trades across the Caribbean Sea.

Northerly the coast trends east of north two hundred and forty miles to Cape Gracias á Dios, and throughout the entire distance from Cape Gracias á Dios to Chiriquí Lagoon, there is a strip of varying width of flat, swampy, lagoon dotted country, formed of the detritus pushed out from the ragged edges of the gaunt volcanic skeleton of the Isthmus by the numerous rivers.

Though this coast has grown out into a practically tideless sea, it is interesting to note how the constant rush of the trade winds and the accompanying uninterrupted hammering of the waves, in a single direction, have moulded the coast line and given it features very similar to those of our own coast south from New York.

In one place the sands are shifted along the shore and all the river mouths are deflected in the same direction ; in another the sand is beaten directly back upon the coast to form a narrow, cordon littoral.

On approaching the coast the shore appears low and unrelieved for miles into the interior, where blue hills can be seen rising above the trees. On the right, the high blue mountains of the Mosquito Coast are visible, and directly ahead, if the day be clear, tower the mighty turquoise masses of the Costa Rican volcanoes.

Crossing the bar and traversing the harbor lagoon to Greytown, a flat-bottomed, stern-wheel steamer offers the means of navigating the river. For three or four miles from the harbor, as far as the mouth of the San Juanillo, which enters from the right, the course of the river is comparatively direct, there is always a good depth of water, and the stream is bordered on both sides by a broad strip of luxuriant zacate grass, the home of alligators, *garzas* or white herons, and numerous small birds.

The San Juanillo, which drains a large section of low lagoon country, is at its confluence with the San Juan a larger stream than the latter, and could easily be mistaken for the main stream. The view up the San Juanillo at this point is characteristic and beautiful in the extreme. On one side of the long, curving stretch of the stream at this point is a ribbon of zacate grass, even and regular, waving like a field of grain, on the other a continuous wall of the graceful, glistening fronds of the silico palms tossing and rustling in the wind.

Five miles above the San Juanillo the Tauro mouth leaves the San Juan and flows N. E. to the coast, three

miles below the harbor. From here to the junction with the Colorado the Lower San Juan is cut by numerous islands into a labyrinth of channels. The banks are firm, but there is no sign of hill on either side until the last bend previous to passing from the Lower San Juan into the main river.

Emerging from the San Juan, a broad, straight expanse of river lies ahead with banks wooded to the water's edge, and over the trees, where the river bends to the southward again, looms up the mass of El Gigante, an isolated mountain ganglion, in whose steep ravines the San Juanillo has its source.

From this point to the mouth of the Sarapiquí, a distance of thirteen miles, the river has an average width of fourteen hundred (1400) feet widening to two thousand (2000) feet at several places where groups of low islands divide the stream into several channels.

Five miles above the junction of the San Juan and Colorado is the upper mouth or inlet of the San Juanillo, a narrow, almost grass-hidden canal on the north bank. This San Juanillo will receive further attention later on.

Just below the mouth of the Sarapiquí we have another fine view of El Gigante. Above the mouth of the Sarapiquí the stream is very much contracted by the rocky hill which comes to the river from the north at this point and the current is swift and powerful.

It is an interesting fact that throughout this portion of the San Juan, as well as along the Lower San Juan, there is no lateral drainage into the river. There are many sandbanks along this portion of the river, and during the dry season the steamer channel becomes very tortuous.

At the mouth of the Sarapiquí the river changes its hitherto S. W. general direction and stretches away almost due N. W. for a distance of eight miles to the mouth of the San Francisco, on the north bank ; thence it bends south, southwest, west, northwest, north, etc., in several long loops, the resultant direction being nearly due west to the mouth of the San Carlos, twenty-three miles by the river from the mouth of the Sarapiquí ; and the average width throughout this section is rather less than in the previous one, being about eleven hundred (1100) feet, and the islands occur singly rather than in groups. Heavily wooded hills come to the river on the north bank at several places, and from the upper deck of the steamer glimpses of others are obtained over the tops of the trees which line the river bank.

The south bank of the river is continuously low to within a few miles of the San Carlos ; throughout this section there are, in the dry season, numerous banks, and the depth of water is about the same as in the section below the Sarapiquí. There are also numerous tributaries or *caños* on both sides, those on the south, the Copalchi, Trinidad, and Cureña, sluggish, excessively tortuous streams draining interior lagoons; those on the north the *caños* Guasimos, Tamborcito, Tamborgrande, San Francisco, Danta and Machado; streams, which having their sources in the hills to the north, flow, with the exception of the Machado, through triangular pockets of level swampy ground before discharging into the San Juan. These pockets are usually several miles in depth and their surface is from twelve to twenty feet above the average low-water stage of the river.

Steaming up the straight reach of the river, below the mouth of the San Carlos, the first grand scenery on the river is encountered. Here directly ahead towers the symmetrical mass of the San Carlos mountain with its three flanking conical peaks. This mountain, not less than fifteen hundred (1500) feet in height, guards the lower entrance of the mountain section of the San Juan, and as the steamer makes for it until it seems scarcely a stone's-throw distant, and there is no perceptible break in the dense line of forest which extends on both sides and apparently directly across the river, we wonder if the river bursts full-grown from the earth. Suddenly the steamer swerves to the left till it heads S. E. up the San Carlos, then as suddenly to the right, and, passing close under the shadow of the mountain, enters the narrow, deep, almost currentless cañon of the Agua Muerta. The river for the next thirty-six miles with its numerous turns, its steep mountain slopes rising sharply from the river's edge, its constantly changing succession of mountain scenery is, as Squier says, a tropical Highlands of the Hudson.

Sixteen miles from the mouth of the San Carlos are Machuca Rapids; these rapids, which, at times of high river, are nearly obliterated by the volume of water from above and the backing up of that from below, become during the low-water stage of the river, by reason of the force of the current and the tortuous character of the channel, perhaps the most serious obstruction in the river. Four and five miles above Machuca are Balas and Mico Rapids, and six miles above the latter, Castillo Rapids, at the upper entrance of the mountain defile of the "Desaguadero."

The tributaries throughout this section though numerous are comparatively small and torrential in character ; from the steepness of their descent, however, they would furnish a large and valuable water-power which could be utilized throughout a large portion of the year. On the north bank they are the Santa Cruz del Norte, the Machuca, Mono, Chiquito, Bartola and Castillo, on the south the Siroma and Costa Rica.

The difference between the characteristics of this section and those of the previous one is very marked. The river is much narrower, the average width being six hundred and fifty (650) feet ; there are no islands except small ones at the rapids ; the current, except at the rapids, is slight and at times imperceptible, and the depth in many places is forty to sixty and even seventy-five feet. Above Castillo the character of the river changes again, the tall trees matted with vines so common in the mountain section disappear, the forest growth, though still dense, is less even and coherent, the hills withdraw to such a distance from the river as to be entirely invisible, and the banks are fringed with zacate grass and the feathery silico palms such as grace the banks of the San Juanillo.

Nine miles above Castillo are the so-called Toro Rapids which seem to be merely a bank of loose stones many of which are petrifications, the same in character as those found several miles up Závalo River, the first tributary above Toro on the north bank of the San Juan River. These stones are also said to be of the same nature as those found in Lake Nicaragua and to have been swept here by the current of the river. The average width of the river from Toro to the Lake, a

distance of 26.9 miles, is eight hundred and twenty (820) feet. The average depth is fourteen (14) feet at low river. The tributaries of the river in this section are the Závalo, Palo de Arco, Melchora on the north bank; the Chico, the Raudal and the Medio Queso on the south bank.

At the head of the river on its northern bank is the village of Ft. San Carlos, climbing from Lake Nicaragua on one side and the river on the other up a low hill and back to the ruins of the old fort.

From the bastions of the old fort the eye wanders westward over a wonderful tropical lake, a grand reservoir about twice the size of Long Island Sound.

Out of the bosom of this lake rises Ometepe, a typical volcanic cone, perfect in its tapering symmetry, and across the blue expanse blow constantly the beneficent Trades. West of the Lake the watershed of the river extends to within eight miles of the Pacific.

Southwest the mighty mountain masses of Miravalles, Orosi, Rincon de la Vieja, Poas, Irazú and Turrialba in Costa Rica, which peered down upon us for an instant here and there as we ascended the river, rise in uninterrupted grandeur.

Southeast, east and north the interminable forest reaches up close to the river and the village.

Ft. San Carlos is almost equally distant from the Atlantic and the Pacific, being in an air line fifty-four miles due west from the coast of the Caribbean above the mouth of the Rio Indio, and fifty-two miles due east of the head of Salinas Bay.

The level of the Lake here at low stage is one hundred and three feet above mean sea level; at its high-

est stage it reaches one hundred and ten feet ; its average annual fluctuation is, however, only about five feet. Thus, the river one hundred and twenty miles long, as we have seen, has an average fall from the Lake to the sea of from eleven to ten inches per mile. This fall, however, is quite irregularly distributed, as follows :

From the Lake to Toro, - - - - -	1.65	inches fall per mile.				
Over Toro, - - - - -	37.30	"	"	"	"	"
From foot of Toro to head of Castillo, - - - - -	2.93	"	"	"	"	"
Over Castillo, - - - - -	83.38	"	"	"	"	"
From foot of Castillo to head of Machuca, - - - - -	19.08	"	"	"	"	"
Over Machuca, - - - - -	63.61	"	"	"	"	"
From foot of Machuca to mouth of San Carlos, - - - - -	.90	"	"	"	"	"
" Mouth of San Carlos to the Sea, - - - - -	11.50	"	"	"	"	"

The volume of discharge of the upper river at the end of the dry season (the mean of six gaugings from above Toro to above the mouth of the San Carlos, May, 1873) is twelve thousand two hundred and eighty-six (12,286) cu. ft. per second.

The volume of discharge of the lower river, May, 1873, was above the Sarapiquí fourteen thousand five hundred and seventy-two (14,572) cu. ft ; of the Sarapiquí itself, two thousand two hundred and fifty-five (2255) cu. ft. per second ; below the Sarapiquí, sixteen thousand seven hundred and seventy (16,770) cu. ft. per second. The Lower San Juan, after leaving the Colorado, six hundred and seven (607) cu. ft. per second ; the Colorado, after leaving the San Juan, sixteen thousand one hundred and ninety (16,190) cu. ft. per second. The gaugings of Childs in 1851, of West in 1865, and of Howard in 1866, give the volume of discharge of the San Juan above the bifurcation of the Colorado, twenty-two thousand five hundred and twenty-eight (22,528) cu. ft. per second, of which twenty thou-

sand seven hundred and forty-three (20,743) cu. ft. passed into the Colorado, and one thousand seven hundred and eighty-five (1,785) into the Lower San Juan. In the wet season Childs found fifty-four thousand three hundred and eighty (54,380) cu. ft. per second, forty-two thousand and fifty-six (42,056) cu. ft. going to the Colorado, and twelve thousand three hundred and twenty-four (12,324) cu. ft. to the Lower San Juan.

Looking back now over the river, it is seen that it is easily divided into two principal divisions: first, the Upper river, from the Lake to the mouth of the San Carlos, comparatively narrow, deep, free from islands, with no obstructions, and with but little current except at the Rapids. Second, the Lower River, from the mouth of the San Carlos to the sea, broad, shallow, filled with numerous islands, and during the dry season obstructed by frequent sandbanks.

Nothing shows the difference in regimen between the Upper and Lower river more conclusively than the comparison of the high and low water stages of each, viz.: Upper river low water, eleven thousand three hundred and ninety (11,390) cu. ft. per second; high water, eighteen thousand and fifty-nine (18,059) cu. ft. per second, an increase of 59 per cent.; Lower river, sixteen thousand seven hundred and seventy (16,770) cu. ft. above bifurcation in dry season, and fifty-four thousand three hundred and eighty (54,380) cu. ft. in wet season, an increase of 224 per cent.

Throughout the year the fluctuations of the Upper river are very gradual, and during the dry season the water level is nearly constant.

In the Lower river the reverse holds good, the result

of the contributions of the San Carlos and Sarapiquí. Even in the height of the dry season, and without any rain having fallen in the valley of the San Juan, rains in the Costa Rican mountains will send enough water down the San Carlos to raise the San Juan two or three feet.

These San Carlos freshets may always be distinguished by the amount of driftwood brought down.

As already noticed, the maximum range of the river at the Lake is seven feet. Below the San Carlos it is about fifteen feet, and below the Sarapiquí twenty-five feet.

These extreme ranges, however, do not occur suddenly, nor even in the same year. The sudden fluctuations of the river, *i. e.*, those occurring in one day, may be said in no case to exceed five feet.

The delta section of the river is particularly interesting to the student of the regimen of rivers.

The Rio San Juanillo has been shown in all previous charts and described in all previous reports as a cut-off or secondary branch of the San Juan. Recent surveys have shown that the San Juanillo is really an independent stream having its source in the ravines of El Gigante opposite the mouth of the Sarapiquí. Under the name Rio Negro it flows nearly parallel with the San Juan for several miles, and then receiving an accession of volume through a narrow canal from the San Juan, it bends away to the north. The San Juanillo may always have been an independent stream, but peculiar features of drainage and topography in that vicinity have suggested the idea that the above-mentioned narrow canal between the San Juan and the Rio Negro is the remains of the original channel of the San Juan.

which once flowed about where the San Juanillo does at present, the Rio Negro being then a tributary of the San Juan.

At that period, doubtless, the sea occupied what is now Laguna Benard, and Silico Lagoon was a bight in the coast under the lee of hills, similar to the present Gorda Bay, and the bight under the lee of Monkey Point.

Later, as the river pushed out a delta, the long and tortuous channel with its flattened slope was unable to carry off the flood volume and this finally burst through the low alluvial apron, along the present bed of the Lower San Juan cutting for itself a more direct channel to the sea. It can easily be imagined then that the large quantity of sediment scoured from the new channel and borne seaward, in addition to the normal sediment load of the river, soon closed Silico and modified the trend of the shore in that locality in such a manner as to compel the discharge of the river in seeking the trough of the sea, to deflect to the northward.

Then began the formation of those lagoons immediately back of Greytown, which were once, without doubt, bights in the shore as was the harbor of Greytown a few years ago, and which were later closed as the harbor of Greytown has recently been.

The sediment brought down by the river, borne away by the waves or deposited upon a deep bottom may for years have no effect. Sooner or later, however, a combination of circumstances, as a heavy flood and a long and severe norther occurring at the same time, dams the river back until an overflow takes place along the line of least resistance to the eastward. This re-

lieves the pressure and at the same time carries a considerable amount of sediment to sea to windward of the main river mouth. This sediment is swept along the shore by the waves until it comes to rest in the quiescent angle between the waves and the main river discharge. Every rainy season then sees an increase in section of the new and shorter channel, and a correspondingly increased amount of sediment discharged from it, and every succeeding dry season sees an accession to the sand spit in the quiescent angle. Finally, this spit extends to and unites with the shore westward; the entire discharge of the river seeks the overflow channel, which becomes the main river; the transference of the river mouth is effected, and the lagoon is born. Years later a second and then a third are formed.

The natural inference of the above is that another bight may in time be formed outside the present harbor of Greytown, and such doubtless would be the case were the formative conditions still the same.

Several circumstances lend color to the belief that the delta of the San Juan is about entering upon an entirely new phase.

An important change has been going on and is still in progress in the regimen of the San Juan itself, namely the transfer of nearly all the volume of the river to the Colorado branch which empties into the sea ten miles to the southward and eastward of Greytown.

The decrease in the volume of the Lower San Juan correspondingly decreases the sediment discharged at Harbor Head and the Tauro mouth.

The sediment discharged by the Colorado has been so acted upon by the waves as to gradually force the

outlet of that river to the southward until at present the waves either beat perpendicularly upon the beach or have a slight southerly resultant.

With the supply of sediment cut off in the vicinity of the delta, and the waves still sweeping diagonally along its northern side, one natural result will follow, viz. : the sand will be cut from the point or eastern half of the delta, and swept into the bight to the westward until the delta is destroyed, and the coast line rectified and hammered into a line normal to the waves.

It would seem that the beginning of this stage had already been attained. The barrier outside of Harbor Head has been eaten through and transported to the westward, and Harbor Head is filling up. The break-water proposed for the restoration of Greytown Harbor will probably modify this rectification to the extent of limiting it to the coast line south and east of the break-water, leaving behind it a secure and permanent basin entirely removed from fluvial influences or dangers.

The scenery of the Lower San Juan and about Greytown, when no silico palms are visible, is no more tropical in character than that of our southern rivers, or the marshes of the St. Mary's River and Cumberland Sound.

From the bifurcation of the Colorado and San Juan to the mouth of the San Carlos, where the river is broad and the luxuriance (in *minutiæ*) of the vegetation of the banks is not perceptible, the effect as one looks along one of the river reaches is not more tropical than that of a Middle State or even New England river in July or August.

Through the Agua Muerta, and for most of the distance between Castillo and Toro, there is, however, no

lack of tropical effects. The huge trees hang covered with luxuriant vines, which twine among the branches, and then fall to the water's edge in dense, heavy curtains, till they form a continuous vertical wall relieved with bastions and flying buttresses.

Above Toro the scenery is even more tropical. Close to the water runs a band of brightest green grass; over this droop the feathery fronds of an unbroken row of palms, and beyond and above the palms towers the fine-cut foliage of great hard-wood trees.

From Greytown to the San Carlos there are now many clearings along the rich bottom lands of the river, the land about the mouth of nearly every tributary having been thus improved. Some of these clearings extend for a mile or more along the river, rich with plantains, bananas, oranges, limes, cacao, coffee, cane and vegetables.

The mouths of these streams offer a secure retreat and harbor for canoes, and the stream itself is a highway to the interior for the hunt, or for *hule* (rubber), or for bringing out the new cedar canoe.

Then over the neighboring spur of hills runs a well-worn trail back into the forest, along which the hunter takes an occasional trip, returning loaded with *chanchos* (wild pigs), *pavon* and *pavo* (wild turkey).

The productiveness of these rich lowlands, when once the flood-waters of the lower river are controlled, and they can be effectively drained, will be wonderful. Below the mouth of the Sarapiquí, and also at Ochoa below the San Carlos, and at Castillo, are large numbers of cattle, and as they gather at the river at night and morning, or feed over the hills during the day, they give a very pastoral air to those localities.

At Castillo there is a village with a population of some hundreds, the picturesque old castle crowning the hill above the village.

The Nicaraguan custom-house is here, and all goods are transferred at this place. There is also something of a garrison in the castle.

At the mouth of the Závalo, just above Toro, there are two or three houses, a depot for supplies for the mines located up the river. At this point also there are thermal springs reputed to be good for rheumatic troubles.

Ft. San Carlos, at the head of the river, is a village of a few hundred inhabitants. There is a garrison here, but the old fort is in ruins.

The scenery of the Upper river is but little changed by high water or low water. In the Lower river there is a marked difference.

In the dry season there is a fringe of grass close to the water's edge, and all the islands have grassy points reaching up and down stream. Banks of yellow sand, favorite haunts of alligators, occur at every bend. Where the banks are vertical, the deep brick red of the clay underlying the soil appears, and at the base of all the spurs which come to the river their bed-rock foundations show. In the rainy season all these features disappear, and the river runs between full banks with the drooping vines trailing upon the water. In March and April these vines put forth their flowers, which hang in long yellow and pink and white festoons. Up in the great cottonwood trees the purple Flor del Toro shows itself, scarlet passion flowers light the woods, the Ibo trees are a solid mass of red flowers, which hide the leaves

entirely ; and another tree, the name of which I do not know, is equally intense in yellow. Then there is a fine white flower growing among the underbrush, which scents the air as with honeysuckle. Along the banks and on the sand-spits running out from the islands, and among the zacate and gramalote grass, grow countless aquatic flowering plants.

Animated nature along the river vies with inanimate in abundance and variety. Though the denizens of the river and the forest can by no means be said to be shy, yet passengers on the steamers have not the opportunities for observation of one traversing the river in a canoe, gliding noiselessly along close under the banks.

If the day be bright every turn in the river shows up a brown, mud-encrusted alligator lying upon the bank, and others poke their ugly snouts above the water.

The triangular fins of sharks may be seen cutting the water here and there : a sudden swirl in the water and a V-shaped ripple moving swiftly away from the canoe marks a startled *tarpon* disturbed at sunning himself in shallow water.

The alligators and sharks, though numerous, I do not consider dangerous. I failed to learn of any authentic instance of their having killed any one, and I have repeatedly seen natives bathing in the river almost literally in the midst of several of the latter.

If near the rapids the river will be full of leaping *zavalos*, offering fine rifle practice. Just after sunset a *danta*, or deer, or manatí, is very apt to be seen crossing the river.

White and blue herons stand along the banks or soar lazily from point to point. Macaws, parrots and parro-

quets scream in the trees; *zopilotes*, or buzzards, circle high in the air; an occasional hawk darts swiftly from bank to bank; black and red and black and yellow songsters and trogons flit along the banks.

The sharp eyes of the boatmen detect every now and then a huge iguana hugging a branch above, though sometimes the first intimation of his presence is a splash as he drops into the water from a height, and with a force that it would seem must burst him. Innumerable smaller iguanas, of bright metallic hues, and with ugly spinal fringes, bask upon the white snags and logs which lie in the water near the banks, and when disturbed dart for the shore, moving their feet and tails with such rapidity that they actually walk upon the water, often for a distance of several yards.

Sometimes a dry branch falling in the boat reveals the presence of a troop of monkeys in the trees overhead. These fellows make grimaces, break off dry branches and throw them down, and shake others as if in uncontrollable rage, until a rifle bullet brings down one of the fattest for the boatmen's dinner, and sends the remainder screaming away into the woods.

Perhaps a little farther on a musky odor shows the presence of *chanchos*, or wild pigs, on the bank above, or some of the men may hear them feeding, and it is usually only a matter of a few minutes to bag one of them.

The air above the great river is never silent. From the first suspicion of morning light, when the bull-voiced *congo*, or howling monkey, wakes the forest with his bel-lowings, to sunset, when the shrill whistle of the *gongolona* marks the hour of six, wild pigeons, macaws, song-

birds and monkeys have their turn. At night equally numerous sounds fill the air; the grunting of alligators, the splash of leaping fish, the screams of tigers, and the cries of nocturnal birds and beasts. Then all at once a heavy booming noise, like the distant report of a cannon, breaks through the night air and reverberates along the river; it is the death-note of some giant of the forest which has crashed to the earth, carrying with it everything in its reach.

Or it may be that lying awake upon a sand bank in the river a low whisper comes from the northeast; this increases to a murmur, then to a sound as of surf upon a distant shore. You look to the rubber blanket over you, roll yourself carefully in the one beneath, and by this time the murmur has become a roar. In a moment the bank of the river disappears, and in the next instant the pelting of the big drops upon the blankets, and the hissing of the dry sand as it absorbs the deluge of the tropical shower drown every other sound.

The scenery of the San Juan is more than difficult to describe. From the day when Diego Machuca (1529) floated down its bosom to the Atlantic until now, every traveller upon the noble river has been struck with its wondrous beauty, and wasted words trying to render the impressions it made upon him. It is impossible to do it justice, and it is almost equally impossible to abstain from enthusiastically making the attempt. There are such contrasts. There are days and days upon the river, and there are indescribable nights; days when the turbid water is indistinct through the gray driving rain, and hisses with the impact of the big drops, the tops of the trees hidden in clouds and the banks sodden and

slippery : and days when the vivid greens, waving trees, glistening water, the cool wind sweeping now up, now down the stream, filling the nostrils with fragrant odors, the songs and cries of numerous birds, and the native canoes traversing the river, all steeped in exultant, tropical sunlight, form a wonderful sensuous symphony.

Nights when through the blackest of darkness the men at the paddles, silently and with heads bent to the pouring rain, force the canoe along, every nerve and muscle alert to avert disaster from contact with the frequent snags and logs that project from the banks.

Nights when the Southern Cross and the Northern Bear look down upon the camp on the sand-bank in mid-river ; when brilliant moonlight falls on the softly-flowing river ; when the forest walls on either side stand out as clearly as by day ; when the palm trees glisten like stacks of burnished sabres, while in their hearts crouch blackest shadows.

But it is at the close of day that the noble river flowing from out the crimson and yellow glories of Pacific sunsets, through miles of emerald walls to the Orient mists of the Caribbean, puts on its most royal attire. Then comes the glory of the day ; from the sky descends a flood of rose, of yellow, of pale green light ; from out the flowing river rise other rose and amber and pale green, quivering lights to meet it. In darkest emerald and blackest velvet shadows the great trees rise, sharp etched, against the western sky, with tufts of moss and leaves and rope-like vines, and many of them take on strange forms, here a face, a demon of the jungle, there a majestic stag's head, and there a lithe swaying shape, a naiad of the tropics. From out the

strange, dark forest comes a cloud of fragrance, and the sound of countless birds and beasts and insects.

Then the colored lights fade, but the fragrance and the cries linger, and the white radiance of the moon falls on the noble river.

Back from the river, in the "mysterious wilderness," the "dark forest," the "unknown jungle," of various writers, there are countless objects of interest to those who do not tire easily, and who do not mind a little bodily discomfort. In these forests grow great cedar, almendro, guachipilin, ceiba and cortez trees, their heads towering far up into the sunlight, their bases buried in a dense undergrowth, through which meander the various tributaries of the San Juan. In the upper portion of the river these tributaries are clear, cool mountain streams, rippling over polished rocks and yellow, pebbly reaches, or tumbling in white spray over ledges of black trap.

In the lower river it is necessary to ascend the streams through several miles of rich bottom lands before the mountain section is reached.

Many a memory vignette of varied scenes and adventures in these forests rises before the writer, but want of space precludes a reproduction.

The days along the San Juan are apt to be hot, *i. e.*, 85° to 90°, but the nights are invariably cool, a heavy flannel sleeping suit and a woollen blanket being found very necessary for comfort between midnight and day-break.

As to health, the valley of the river is, with proper sanitary precautions, as healthy a locality as any in Nicaragua or any other country. Colds and their allied

complaints are unknown, and as for malaria, it has been my experience that with good food, regular habits, mosquito bars and coffee, it is a myth. The night, popularly supposed to be the worst time in which to be exposed, was the time frequently selected for travelling upon the river, in order to avoid the heat and glare of the day. To save time I have repeatedly spent several successive nights upon the river, sleeping as best I could in a small canoe, the intervening days being spent in the woods reconnoitering, and have experienced no ill effects.

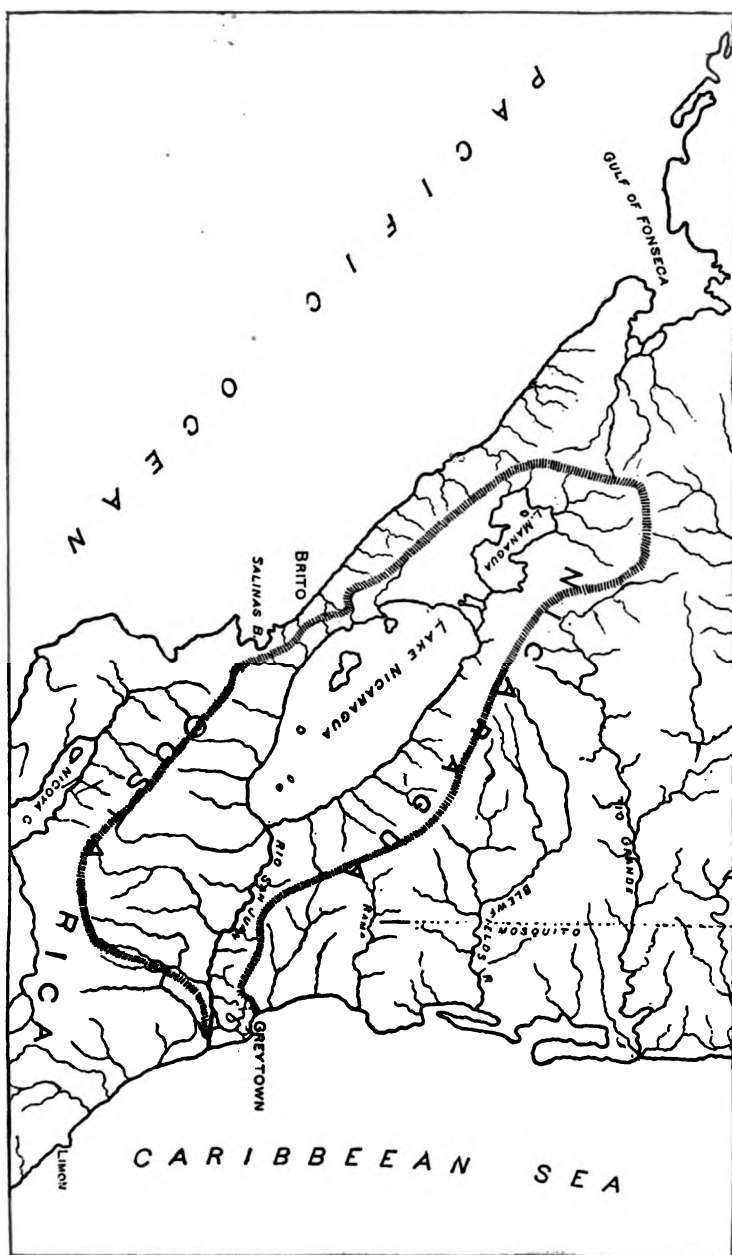
The mosquitoes so lavishly described by some travellers are by no means the unavoidable torments that many suppose. During the day there are absolutely none, and at night, if camped on a sand-bank in mid-river, or travelling in canoe, they give no trouble. If camped upon the bank a bar is indispensable, but then no one who understands anything about travelling in these countries ever goes without his bar, and it is not the slightest trouble to keep the torments out of this.

The maximum temperature noted on the river during six months, from the middle of Dec., '87, to the middle of June, '88, was 92°, the minimum 64°. The water of the river, though warm and often muddy, is pure and sweet, and, after it has settled and cooled itself in the earthen jars of native make, is by no means disagreeable.

Some reader may ask, How does it happen that in a country so little known in geographical detail as the interior of Central America, there exists such definite knowledge of this river?

It is because from the time men recognized the fact that there is no natural strait across the American

THIS SHOWS THE WATERSHED OF THE RIO SAN JUAN DE NICARAGUA



Isthmus, it was seen that at Nicaragua nature had indicated in the most unmistakable way where an artificial passage should be cut.

Twice, as we have already seen, the noble river has borne a rich commerce upon its bosom, once with the tide setting eastward, once westward; and for years, through every vicissitude of despotism intrigue and perverted judgment, it has waited for the day, certain as the recurrence of the seasons, when, between its fertile banks, the stream of the world's commerce shall flow eastward and westward, from ocean to ocean, in constantly increasing volume.

Unless all signs fail this time is close at hand, and in a few years the San Juan and Lake Nicaragua will be alive with white sails and the throbbing propellers of a mighty traffic.

THE RUSSIAN TRAVELLER PRJEVÁLSKY.

BY

EUGENE SCHUYLER.

On the first day of last November (1888), according to our calendar, General Nicholas Michailovitch Prjeválsky (this name is properly transliterated Przheválsky, but it is best to follow the received English and French spelling) the great Russian traveller, the explorer of Eastern Central Asia, and probably one of the last of the adventurous travellers, died of typhoid fever in the little town of Karakól on the road from Vierny to Kashgar. In his last moments he asked to be buried on the shore of Lake Issyk-Kul, in a spot which, surrounded by mountains covered with eternal snow and close to the blue waters of the lake, presents itself as vividly to me now as when I first saw it 15 years ago.

Personally, I met Prjeválsky but twice; once when he spoke before the Imperial Russian Geographical Society at St. Petersburg in 1874, when he received the gold medal; and a few days afterwards at the house of a friend. But even before that his name was known to me from his travels, and since that has become familiar to every one who interests himself in the geography of Central Asia.

Before speaking of his work as a traveller and explorer it is interesting to touch on his early life; and for this we fortunately have some auto-biographical sketches

written in 1881, and recently published in the *Russkaya Starina*.

Prjevalsky was born on April 12, 1839, in the little village of Otradnoe in the Province of Smolensk. He was the eldest son of a family comprising two other sons and a daughter, and was left fatherless at the age of seven. Although of Catholic and Polish origin his parents both belonged to the Russian Orthodox Church. His mother was a woman of strong character, strict and severe, who believed in the rod as the best method of bringing up children. As the family possessed about 3000 acres of land and 135 serfs, they were neither rich nor poor. Prjevalsky's early education was, as was the custom of families in those days, conducted entirely at home, with teachers competent and incompetent—most of them young theological students sent out from Smolensk. He was a wild, unruly child, always escaping to the woods, his passion being sport. When he was ten years old he was sent with his brother to the high school or gymnasium at Smolensk, where he was left under the charge of a tutor, who took him to school, carried his breakfast to him, and then brought him home and strictly supervised him. At that time teachers in the country schools in Russia were not always up to the mark, and were frequently coarse and brutal; and these boys, in common with others, suffered much. Prjevalsky says however that one advantage was that they all remained boys and did not ape the fashions of men as school-boys do nowadays; and as their summer vacations were very long—because it was always necessary to repair or alter in some way the school buildings—they were enough at home to prevent their being spoiled by town life. His

earliest reading was about travels and adventures, but he was such a "bad boy" according to contemporary ideas, that all his mother's friends advised his being put into the military service and sent off to the Caucasus, whither all bad boys were sent at as early an age as possible. Nevertheless he did well at school, and was the first scholar in his class; although he nearly spoilt his career by taking part in a school rebellion a few days before he left it at the age of sixteen. He had then decided to enter the military career owing, as he says, to having read a book called "The Fearless Warrior," which gave him the conviction that this was the only way of being really virtuous and a benefactor to his kind.

In September, 1855, just as the Crimean War was ending, he went to Moscow as a *Yunker* in a Biélefsky Regiment. A *Yunker* at that time, as now, was something between an officer and a soldier. As belonging to the nobility he was on equal terms with the officers, but in all other respects—food, quarters and discipline—he was on a level with the soldiers. Soon after he joined his regiment they went on a march. "I had," he says, "about forty companions of all sorts of rascals, some of whom, on the very first day, stole some boots and got drunk in a tavern. This worked on me very much, and at first disenchanted me with the military service. I used to go shooting in the woods, and often wept there. The idea came to me then, that perhaps I could get out of it in some way by going into the Military Academy. My regiment at this time was stationed in the province of Tula, and the peasants constantly turned to me with the question, 'What is the matter with you to have been sent as a soldier so young?'"

He did not like the *Yunkers*, who were his comrades, and to whom the officers then paid no attention, and who were besides so brutal in their relations with the soldiers that, although he was habituated to the customs of serfdom, his feelings were revolted, and his only solace was in shooting in the woods, in studying the habits of animals and botany, of which he had got some knowledge at school. In the summer of 1856 his regiment moved to the town of Kozlóf, in the province of Tam-bóf, and were a mere band of robbers, because generally nothing was bought either for men or horses. "Everything was obtained free. Turns were kept in this, and once, when my turn came, I remember that I killed a turkey with my bayonet, which we afterwards ate in camp." Soon afterwards he was made an officer, and sent to the Polótzk regiment in his own province of Smolensk, by which he was able to go home and bring one of his serfs as a servant, who was an excellent sportsman, and who by some means was always able to supply both him and his horses with food, free. At this time, as he had no liking for the dissipated life led by the officers, he read many books of history, travels and novels, and first got the idea that it was his duty and his fate to become a traveller. He petitioned the commanding officer to be sent to the Amur, which, owing to its recent occupation by Russia, was uppermost in the minds of all, the result of which was his being placed under arrest for three days; and this decided him to enter the Staff Academy. He busied himself with his studies alone, for at the time there were no educational facilities offered to an officer; and when he thought that he was nearly prepared, he was much put back by

the advice of one of his friends to learn the Military Code by heart, as this would be the chief subject of examination. This he found utterly repulsive and impossible, but nevertheless he went in August, 1861, to St. Petersburg—a city up to then entirely unknown to him, and found himself without money, but succeeded in passing the preliminary examination with credit, for, fortunately, the questions on the Military Code were not difficult. At first he had hard work to get on, and often went without his dinner. He read up his favorite subjects, and tried to make some money by writing. One article, "The Recollections of a Sportsman," was accepted by a leading journal; but he was paid nothing for it, on the ground that it was not customary to pay for the first article. As his theme on entering the second year he took "The Amur Region," which, of course, had to be compiled from what had been published at the time; and soon after this, the Polish rebellion having broken out, offers were made for volunteers, with certain privileges. He accepted them and went back to his old regiment as an aide-de-camp. He passed in this way another year, always with his mind set on travelling; dreaming at that time of going to Africa—although when he reflected that he had no money, and on the amount that such a journey would cost, he concluded to turn his attention to Asia. A friend presented to the Russian Imperial Geographical Society his article on the Amur, and he was elected a member, and his article was printed. His finances at this time were somewhat better, and he was able to obtain books; one of them, which made a strong impression on him, being Buckle's "History of Civilization," the rest being chiefly on geography and

travel. At the end of 1864 he went to Warsaw, where, at his request, he was made a teacher in the *Yunker* school and librarian, and where for two years he diligently prepared himself for what he considered his future task by lecturing on geography, compiling a textbook, renewing his studies of zoology and botany, and when at home in the summer, collecting a herbarium. Finally, at the end of 1867, on the representation of a gentleman who was a friend of his, and at his own particular request, he was ordered as a staff officer to Eastern Siberia, and immediately started.

He remained at Irkutsk only about a month, having, meanwhile, charge of the library, and was thus enabled to post himself as to the region. He was delighted with Siberia, and when he was ordered off with a nominal commission of taking the census of the population on the river Usuri, his only discomfort was that the German friend, whom he had brought out at his own expense, had unfortunately fallen in love with some Amalia before starting, and refused to go further. Nevertheless he found another companion, and spent several months in a boat on the Usuri and Lake Khanka, and wrote a Report, which, owing to his ignorance of languages, had very little to do with the population, of whom he had formed an unfavorable opinion, and more with the natural history of the country. He was very much depressed, therefore, when his commanding officer, on reading the report, said: "I have read your whole report, but I knew the whole thing, without your saying it, that in that region it is d——d disagreeable." However, Prjevál'sky sent his account to the Geographical Society and was rewarded with a

silver medal, which he considered a very slight recompense for his services : although to those who knew what other Russians were doing at the same time, it seemed a sufficiently large one. M. Seménof, at that time the Vice-President of the Society, who had himself written very noteworthy accounts of his own journeys in Asia, took up Prjeválsky's case, and in the autumn of 1870, the latter started on a journey through Mongolia, very much hampered by lack of means, as he received for his expedition only \$2000, which, however, he made last him for over two years ; and meanwhile visited Lake Koko-nor, traversed some of the regions mentioned by Marco Polo, but visited by no subsequent traveller, found the rhubarb of commerce growing wild, paused for a while in Pekin, where he took lessons in astronomy at the Russian Observatory, and would have gone into Tibet, whither he was almost invited by the Tibetan officials, but he had no more funds, and was obliged to return to Koko-nor in a state of great destitution. Ragged and footsore he went back to Siberia, with an excellent collection of objects of natural history, including birds, skins and furs, eleven species of fish, 3000 specimens of insects, 4000 species of plants, and a great number of geological specimens, besides all the topographical observations which he had made. On his return to St. Petersburg he was given the gold medal of the Geographical Society, and was received with enthusiasm. In spite of the rich result which his travels had yielded for natural history, many persons were disappointed, and I must admit that I then shared their views, at the small amount of ethnological and historical information which he had brought back, and they were

inclined to criticise the conduct of these expeditions where it was so important to learn the actual complexion and character of the population. While Prjeválsky had prepared himself for his work in an unusually careful way, he had neglected one thing, the acquirement of a knowledge of native languages, and was therefore obliged to employ two and sometimes three interpreters—that is a Cossack who spoke Tartar, some one else who spoke Mongol, and often a third. Of course, information obtained in this way could not be relied upon as entirely accurate, as I have myself experienced. It was a pity that neither the Government nor the Geographical Society was willing to spend money enough to send with the expedition one or two students of the Academy of Oriental Languages, who could have greatly facilitated the task of Prjeválsky, whom all admitted to be the leader, and the only one at the time possible to conduct such expeditions.

Prjeválsky had the personal pleasure of showing his collection to the Emperor, and was promoted to be Lieutenant-Colonel, and received the right to a pension of \$100 a year, which for a Russian officer is a large sum. More than that, he won the attention of the Grand Duke Constantine who is always awake to everything that concerns science, and who had founded the medal of the Geographical Society which had been given to him; and, by the Grand Duke's intercession with the Minister of War, he was placed on the General Staff of the Army, from which—in spite of his studies at the Academy and his services—he had been excluded, because his name was too much like a Polish one. In August, 1876, after several detentions, he was ready to start on another

expedition towards Tibet, an amount of about \$15,000 having been allotted to him, which enabled him to supply himself with all that was absolutely necessary.

He crossed the Tian Shan into Kashgaria, which was then ruled by Yakub Bek, and went into the basin of the river Tarim; through a region where no European had ever penetrated, towards the old trade route which ran near the lake called Lob-nor, mentioned by Marco Polo—a route abandoned for many ages on account of the gradual encroachments of sand and desert. He reached the frontiers of Tibet and felt confident that he could have got to Lhasa itself had he not been prevented by illness. The great geographical result of this expedition was the rediscovery of Lob-nor; and of the great mountain chain hitherto unknown, which rose immediately to the south of it. His views were afterwards criticised and combatted by Baron Richthofen, the distinguished Chinese scholar, and President of the Berlin Geographical Society, but it is now generally admitted that Prjeválsky was right, and the nearness of the lake to the mountains explains much that was hitherto hazy in the traditional geography of this region, dependent on the accounts of the old Chinese writers. He made, too, one great discovery in natural history, in finding wild camels which had been talked about for 400 years, “thin, slim, not bigger than a horse, and with two humps, with a keen scent; climbing like goats; and hunted by the natives for the sake of their wool.” Of these he was fortunate enough to obtain four skins.

This was a short expedition lasting only eleven months, and was a sort of reconnaissance of the route to Tibet, like his subsequent journey of 1879–80.

When he arrived on the Tibetan frontier, after being asked whether he was English or Russian, he was begged not to advance further. He remarks in his book—which has been well translated into English by Mr. E. Delmar Morgan, who has also translated his “Mongolia,” and who, it is to be hoped, will furnish also a translation of his account of his last journey—“that it was useless for four men to combat the fanaticism of a whole nation ;” and he went back across the plains of Tsaidam to the Lake Koko-Nor. Then he tried to go to the sources of the Hoang-Ho, or Yellow River, but was unable to find his way amongst the curious labyrinth of precipices and ravines that open out on every side ; and contenting himself with his very rich botanical collections and his ethnographical observations, returned across the Alashan country by the way of Urga to Irkutsk.

The results of the last two journeys of Prjeválsky were so remarkable that he received the Humboldt medal of the Berlin Geographical Society, the great medal of the Royal Geographical Society (London), the medal of the Italian Geographical Society, and others, all of which had their influence in Russia, and enabled the Russian Society to grant him about \$25,000 for his new expedition, during which he explored the sources of the Hoang-Ho, northern Tibet, and the Tarim basin, travelling in all about 5000 miles.

The expedition consisted altogether of twenty-one persons, including Prjeválsky, his assistant, Robarófsky, whose name will, without doubt, be heard again, Koslof, and interpreters, Cossacks, soldiers, etc. He started in 1884, this time for Kiakhta, crossed the desert of Gobi

to the head-waters of the Hoang-Ho, crossing one pass of the height of over 16,000 feet, discovering many lakes on this high plateau, which is spoken of as a marshy plain, the Sing-su-hai or "starry sea" of Chinese historians,—and we can easily imagine why the great Yellow River has at times such inundations, which cause devastation through northern China, and why Embassies are sent from Peking to offer sacrifices in order to propitiate the deities controlling its course. At the height of 11,700 feet he found a great lake to which he gave the name of "Never-Freezing;" and at the height of about 14,000 feet two others, which he called the Russian Lake and the Expedition Lake. Here the attacks from the natives obliged him to descend the river; and finally crossing the range of the Altyn-Tagh he came down to the banks of the Lob-nor, where he remained for several months during the winter. Subsequently, after traversing the desert of Keria and Khotan, he crossed the Bedel Pass, 13,700 feet high and came back to Karakól in the Russian dominions where, singularly enough, he afterwards died.

He was about to start on a new expedition, indefatigable as he was, hoping this time to reach Lhasa; thinking that the English failures on the southern side might increase his chances of getting into this forbidden country of Tibet on the north—when he died. The expedition however is not given up, but will be carried on under the leadership of Colonel Pevtsov, who has already made his mark by several journeys in Mongolia, and proved himself a worthy successor to Prjeválsky.

To us, who take only a scientific interest in the geography of Central and Eastern Asia, it is amusing

to find that while the English highly approve of the political aims, and especially of the political information of the three last English travellers, on routes near and crossing those of Prjeválsky—James, Carey and Younghusband—they are much startled by the final chapter of Prjeválsky's account of his last journey, where he ventures on criticisms of the Chinese Government and officials in Chinese Turkestan, and shows the ease with which the Russians might occupy that country, and the advantages it might give to the Russian Government. Should the Russians ever find it profitable to themselves to occupy this inhospitable and barren waste, either for repressing disorders on their frontier, or for approaching nearer to India, it will perhaps be due not so much to the travels of Prjeválsky—great as their results have been—as to the labors of Mr. Nicholas Petróf-sky, who, after a career of many years in Tashkent, has been for ten years past the Russian consul in Kashgar.

If any practical inference may be drawn from Prjeválsky's expeditions, it will be to show what great results can be obtained from an economical expedition, so long as it is under good leadership, and for this Prjeválsky had shown every quality; and by an explorer who has especially qualified himself for the task as Prjeválsky had done. It might be as well, therefore, for us to consider whether we could not do better to explore our continent for ourselves, whether North or South America, rather than leave the greater portion of the task to English, French and Germans.

GEOGRAPHICAL NOTES.

GEOGRAPHICAL SOCIETIES AND JOURNALS.—In the *Geographisches Jahrbuch*, vol. 12, Mr. H. Wichmann gives the statistics, past and present, of geographical societies and periodicals throughout the world.

The parent Geographical Society is that of Paris, founded in 1821.

In 1830 there were 3 societies; in 1840, 4 had been added; in 1850, 3 more; in 1860, 6 had been added and 1 had been dissolved; in 1870, 11 new ones had come in; in 1875, 13 new societies had been formed, and 3 had ceased to exist; in 1880 there were 31 new names; in 1885, 43, and in 1888, 10; while the extinctions were, for 1880, 3; for 1885, 10; and for 1888, 6.

The Societies now in existence number 101, with 44 branches, distributed through 21 countries and 135 cities. France heads the list with 29 societies and 19,800 members. Germany comes next, with 22 societies and 9200 members; then Great Britain (and the British Empire), with 9 societies and 5600 members; Italy with 4 societies and 2550 members; Austria-Hungary, with 2 societies and 1950 members; and the United States, with 3 societies and 1500 members. In the number of societies, Switzerland with 6, and Russia with 5, would take precedence of Italy; but the total Russian membership is only 1330, and the Swiss 1000.

The largest single societies are the Royal, of London, with 3391 members; the Paris, with 2184; the Paris Commercial Geographical, with 1560; the Vienna Imp. Royal, with 1364; the American, with 1309; the Italian, with 1232; and the Berlin, with 990 members.

Of the societies divided into sections, or branches, the largest is the Berlin *Zentralverein für Handelsgeographie*, with 10 branches, and a total membership of 3200; then follow the Lille *Société de Géographie*, with 4 sections and 2027 members; the Paris *Société de Topographie*, with one section and 1165 members; the Bordeaux *Société de Géographie Commerciale*, with 7 sections and 1120 members; and the *Scottish Geographical Society*, of Edinburgh, with 3 sections and 1102 members.

The geographical journals, which numbered 126 in 1885, are now 130 in all. Of these 45 are published in French, 41 in German, 10 in English, 9 in Russian, 6 each in Italian and Portuguese, 5 in Spanish, 3 in Dutch, and 1 each in Danish, Swedish, Hungarian, Roumanian and Japanese.

Mr. Wichmann thinks that the geographical character, and even the existence, of some of these societies and journals may be seriously doubted; but he does not believe there is any falling off in the general interest in the subject of geography.

However this may be, it is certain that the activity in the formation of new societies during the decade 1876–1885, when 74 were founded, was nothing less than feverish; and the slower progress of the last four years must be taken as an indication of a healthier state.

A CORRECTION.—In the *American Antiquarian and Oriental Journal*, for January, Dr. Daniel G. Brinton criticises Mr. Thomas de St. Bris and his *Discovery of the Origin of the Name of America*, in the following words :

“The year 1888 was fruitful in follies of Americanists, so-called, and here is another to add to the list. It appears under what we presume is a pseudonym ; but on the title-page bears the assertion that it was read before the American Geographical Society. If that is so, it is a pity that so respectable a society gives opportunities for the display of such ignorance and folly. . . . But we cannot close without expressing our wonder and sorrow that such respectable journals as the *Popular Science Monthly*, the *Critic*, the *New York Times*, etc., would lend their approval to such flagrant misuse of authorities and dense ignorance of the subject. Is it not obvious to any one that since the natives had no idea of the continent as a whole, that they could not have had a name for it ?”

It ought to be said that the American Geographical Society never heard of Mr. Thomas de St. Bris until his book, with the unauthorized announcement on its cover, was received at the library. It appeared soon after this that he had written, under the the name of T. H. Lambert, a paper which will be found in the *Journal* of this Society for the year 1883 ; and those who have the time and the courage to read the two publications will find no difficulty in arriving at the conclusion that Mr. Lambert has a prior claim to all the folly and ignorance which Dr. Brinton discovers in Mr. de St. Bris. In any case this Society declines to be responsible for the one or for the other.

A DEADLY GAS-SPRING IN THE YELLOWSTONE PARK.—Mr. Walter H. Weed writes from Washington to *Science*, of February 15, that last summer he discovered in the extreme north-eastern portion of the Yellowstone Park, on Cache Creek, two miles above its confluence with Lamar River, a spot where fatal gases come out.

The ravine, or gulch (it is called "Death-Gulch,") begins in a basin about 250 feet above Cache Creek, and just below this basin was found the fresh body of a silver tip grizzly bear, and above this the body of another, long dead. Near by were the skeletons of other bears and an elk, and in the bottom of the pocket, or basin, the fresh remains of squirrels, hares, and other animals, besides dead butterflies and other insects. There was no trace of violence in any of these remains, and the animals had clearly been asphyxiated by the noxious gas.

In the narrow and steep ravine there can be no accumulation of dead bodies, for the rush of the water, after heavy rains, must sweep everything before it.

The place abounds in sulphur, the channel is cut in beds of dark gray volcanic tuff, and the clear, cold stream at the bottom is sour with sulphuric acid.

THE LAKE GLAZIER FICTION.—"The evil that men do lives after them." Capt. Willard Glazier has long been dead and buried, for all serious men, but his story of a Lake Glazier, found by himself to be the true source of the Mississippi River, is still accepted in some parts of the world as an authentic narrative.

The *Revista* of the Argentine Geographical Society is the latest victim of this mystification, which owes its continued vitality to the Royal Geographical Society of

London. That Society, in a spirit of trustfulness worthy of respect, published in its *Proceedings* for January, 1885, the letter and the map which Capt. Glazier offered as proofs of his achievement. Recognised in this way by a Geographical Society in good standing, Capt. Glazier was enabled to persuade himself and some other persons that he had done something. Unfortunately for him, before he had passed from the scene his romance was taken up by two competent geographers, Mr. Russell Hinman, of Cincinnati, and Mr. Henry D. Harrower, of New York. Mr. Hinman, in a letter to *Science*, of Aug. 13, 1886, showed, with corroborative maps, that Capt. Glazier knew nothing of the Mississippi, and that he had published as his own several passages and a complete table of meteorological observations, from the work of Schoolcraft, printed in 1820. Mr. Harrower, in a pamphlet dated October, 1886, added a number of maps to those given by Mr. Hinman, and reproduced from Schoolcraft's book the table of meteorological observations which Glazier, by a process of unconscious cerebration, sometimes called by a harsher name, had brought forward as his own.

The date assigned by Glazier to his reputed discovery and voyage was the year 1881. It was shown by Messrs. Hinman and Harrower that the head-waters of the Mississippi had been correctly laid down long before in the map published by the United States Land Office in 1879.

These facts were summarised and correctly stated in this Society's Journal, for 1886, and they ought by this time to have reached Buenos Aires, and even London. It can do no harm to repeat them now for the benefit of

those who continue to believe in the existence of Lake Glazier and its discoverer.

THE NAME OF VESPUCCI.—The January number of the *Bollettino* of the Italian Geographical Society states that in November last Mr. G. Govi laid before the *Accademia de' Lincei*, in Rome, a letter written by Vespucci to Stanga, the Milanese Commissioner at Genoa, under date of Seville, 30 December, 1492. The signature reads: *Amerigho Vespucci*.

The authenticity of the letter is practically established by the handwriting, the turn of expression and the subject, and also by the fact that Mr. Govi discovered it in the Gonzaga Archives, at Mantua, together with other documents that refer to it. It mentions by name the Mantuan Ambassador Salimbeni.

The discovery of this letter will grieve, but cannot dishearten, the ingenious persons who have proved to their own satisfaction that Vespucci and Waltzemüller invented the name *Amerigo* after Columbus's Fourth Voyage, 1502–1504.

THE INTERNATIONAL GEOGRAPHICAL CONGRESS AT PARIS.—This Congress will be held in the week of the 5–11 August, 1889, at the Hôtel de la Société de Géographie, 184 Boulevard Saint Germain. One special meeting will take place in the hall of the Trocadéro, offered by the Directors of the Exposition for the use of the scientific and learned societies.

It is hoped that the French railway companies will establish reduced rates of fare for members of the Congress.

There will be six groups of subjects for deliberation and discussion :

- I. The Mathematical : Geodesy, Hydrography, Topography, Cartography.
- II. The Physical : Meteorology and Climatology, Geology, Botanical and Zoological Geography, Geography of the Oceans, Ethnography, Medical Geography.
- III. The Economical : Commercial and Statistical Geography.
- IV. The Historical : Historical Geography, History of Geography and Cartography.
- v. The Didactic : Instruction in and Diffusion of Geographical Knowledge.
- vi. Travels and Explorations.

Communications and questions for discussion, if sent in early, will be referred to the proper committee, each committee, at the same time, reserving the right to draw up a programme of the questions properly belonging to its own province. These programmes will be distributed without delay.

One request made by the Committee on the Organization of the Congress does not seem to have been made with deliberation. It is asked that each Geographical Society prepare an account of the travels and the publications which have most largely contributed to the progress of Geographical Science during the XIX. century in the country or district represented by the Society. This account is to embrace a list of travels and voyages, with their dates, the names of the countries visited, the discoveries made, and the movements, industrial and commercial, to which these travels gave

rise. Sketch-maps and itineraries are to be added, and also a bibliographical Index of works on geographical subjects, written by the scholars of the country under consideration.

These accounts, once made, are to be arranged by a Special Committee, and finally published as a History of Geography in the XIX. Century.

There will be few persons disposed to undertake, on short notice, such a task as the one proposed by the Committee on Organization ; and the usefulness of the work, even if accomplished, is open to question. No one account, so prepared, could fail to be partial and fragmentary in spirit and in performance, and not even the *imprimatur* of the International Congress would avail to give it authority.

THE ASCENT OF ARARAT.—Mr. Jules Leclercq, of the Royal Belgian Geographical Society, met at Tiflis in September last two students of the Moscow University, Messrs. Markoff and Kovalevsky, who had just returned from an expedition to Mt. Ararat.

At Mr. Leclercq's request they wrote an account of their adventures, and this is published in the *Bulletin* (1888, No. 6) of the Brussels Society.

Mt. Ararat stands in N. Lat. $39^{\circ} 42'$, E. Long. $43^{\circ} 38'$, where the frontiers of Russia, Turkey and Persia meet.

. It has two summits, the Great Ararat, to the N. W., and the Little Ararat, to the S. E., with a distance of 7 miles between them.

The measurements of the Great Ararat make it, some more, some a little less, than 17,000 feet in height. Gen. Chodzko, who spent five days on the mountain

while conducting the trigonometrical survey of the country in 1850, fixed the altitude at 16,916 feet. Little Ararat is about 4000 feet lower.

The Moscow students and their party made the ascent on the 12-13 (24-25) August, on horseback, to the height of more than 10,000 feet, and the rest of the way on foot.

By half-past three in the afternoon of the first day they had reached the elevation of 12,200 feet, and two hours later stood on a little platform of rock 1000 feet higher. Here they passed the night, suffering a good deal with headache and nausea from the effects of the rarefied air. The temperature was about 19° Fahr. At 5 A.M. they took up their task again. Soon after starting they passed a conical rock on the south-eastern side of the mountain. This rock, Mr. Markoff thinks, stands on the snow-line on the S. E., at about 13,500 feet.

The path led at times across sandy tracks covered with gravel, and two of the party gave out and returned. One of the guides saw a pole planted at some distance ahead, and proposed to make use of it to prepare some tea. A halt was made, and Mr. Markoff fell asleep. When he awoke the tea was ready, and there were but two small pieces of the pole left. On one of these were the Russian letters, C. B. (S. V.), and on the other, H. K. (N. K.)

The weather was magnificent, with a clear sky and a light breeze from the south.

At 14,800 feet Mr. Markoff found among the stones a live lady-bird, of a brilliant red, and at 15,500 feet there were flowers growing on a little heap of sandy ground. At

16,000 feet the thermometer in the sun marked 72° Fahr. When the top was nearly reached the wind, blowing from the left, brought with it a strong sulphurous smell. It was 2 P. M. when they stood at last on the summit. The mountain was covered with a bed of snow, divided by a precipice that began at the summit level on the N. E., and sank toward the S. W. Here Mr. Markoff found on the hard, dry snow another lady-bird, less brightly colored than the first.

The view was obscured by mists on the horizon ; but, according to Gen. Chodzko's report, the eye takes in on a clear day both Kasbek and Elburz (the latter 280 miles distant) to the N., the Black Sea, 160 miles away to the W., and the Caspian, 200 miles to the E. Mr. Bryce, in 1876, made out, more than 200 miles to the S., "the faint blue tops of the Assyrian mountains. . . that look down on Mosul and those huge mounds of Niniveh, by which the Tigris flows."

The first recorded ascent of Ararat was made in 1829 by Prof. Parrot, of Dorpat University. Since then the feat has been accomplished eight times, but devout Armenians firmly believe that the sacred mountain-top is inaccessible to man.

A CURIOUS DOCUMENT.—There appears in the *Journal of the Manchester Geographical Society*, Vol. 4, Nos. 1-6, pp. 191-193, what is meant to be the translation of a letter from the Portuguese Minister of Marine to the Lisbon Geographical Society.

The letter has for its subject the development of the Portuguese African colonies, but the English in which it is expressed is more precious than Mossamedes and

Mozambique. Pedro Carolino is at last justified of his children, for here is a translator who can rival the finest phrases of "The New Guide." He says of the Lourenzo Marquez Railway: "This is an urgent necessity, and imperative of the Government, the which finds itself firmly disposed to attend to without any delay."

The Minister's views regarding the east and west coasts are set before the reader in these words:

"It is not possible to apply an economic legislature which has every reason to be for Angola.

"We can, and ought to, treating as much as possible to naturalize the colony, for which she offers precious elements, facilities on par of this frankness, the navigation of the Zambezi, to establish moderate duties on customs for the transit of merchandise destined for the interior, and make a return possible of the enormous mineral riches of the province."

It appears, farther on, that there is another step to be taken, and that the "Portuguese Government has not refused to advance it by itself, but for this it cannot contain the responsibility in the maintenance of a restrictive policy, which an alien word of absolute justice will make it fall in a moment."

The passages quoted, and many more like them, are seriously presented to the English public as the composition of a statesman in possession of his senses; and it remains a mystery how such gibberish could find its way into print.

CONVERSATIONS WITH STANLEY.—Mr. Woldemar Kaden "communicates" to the *Deutsche Rundschau für Geographie and Statistik*, for January, an article in

which Prof. Paolo Mantegazza writes of his conversations with Stanley.

The first of these was with a beautiful Countess, to whom Mantegazza showed the traveller's photograph. The face, she said, was full of energy; and when told whose face it was, she cried out: "Oh! then Stanley cannot possibly be dead. He cannot die!"

The next scene was at Berlin, where Mantegazza and Baron Negri took part in the Congo Conference. They were together when they met Stanley for the first time. Negri, old in years but full of youthful ardor, rushed forward to embrace the great explorer, who drew back with a forbidding look upon his face.

Then Mantegazza began to express in his broken English the emotions which he and Negri felt at the meeting. There was no response from the "Father of the Congo;" and Mantegazza tried German with the same result. "Our Italian enthusiasm" he says, "broke against the granite in this man of the north;" and yet granite does not seem to be the proper word.

The third conversation was really the first. Mantegazza sat by Stanley's side, at the dinner given by the Emperor to the delegates to the Conference. He tried a little flattery. "What a thing it is," he said, "to sit here at the same table with the lord of Europe (Bismarck) and with the greatest traveller of our century!"

"Oh! replied Stanley, you Italians have great travellers."

"Do you mean Columbus?"

"Columbus, certainly; but I think that Marco Polo is perhaps greater than Columbus."

Mantegazza asked whether Stanley was English or American.

"By birth" was the answer, "I am an American, but in feeling a cosmopolitan."

Stanley ought to know best, but the dictionaries make him a Welshman. Be this as it may, he interested Prof. Mantegazza to the point of making him prophesy with the Countess: "Stanley cannot possibly be dead. He cannot die!"

A NEW LAKE IN AFRICA.—In *Petermann's Mittheilungen*, Band 35, Nr. 1, Mr. H. Wichmann sums up the results of Count Teleki's expedition to Central Africa. After a two months' halt on the Baringo Lake, the expedition, on the 10th February, 1888, set out on a sixteen days' journey across the Leikipia plateau, from 8000 to 9000 feet high, and on the 6th March arrived in $2^{\circ} 20'$ N. Lat., at the southern end of a great lake previously unknown, the Basso-Narok, or Black Lake, to which Count Teleki gave the name of Rudolf. The surrounding formations are volcanic and bare of vegetation at the point reached, so that the advance to the N. was made along the eastern shore, and on the 7th April the explorers came to the northern end of the lake, in $4^{\circ} 45'$ N. Lat. The waters were full of hippopotami and crocodiles, and abounded in fish, the principal food of the scanty population. In the 54 days' march only two small settlements were seen. To the east of the northern end of the lake lies another, smaller and salter, and to this, the Basso-na-Ebor, or White Lake, was given the name of Stephanie. The farther progress to the N. was stopped by the rainy sea-

son, which laid the whole country under water. The expedition returned along the eastern shore of the Basso-Narok, and reached the Baringo Lake on the 29th July, after a circuitous march through the country of the nomadic Turkana and along the dry bed of the Trguell River. There was no game to be had, and the carriers were obliged to live on berries and such plants as they could find. The coast of the Indian Ocean was reached at last, on the 25th October, near Mombaz.

AFRICAN SLAVERY AND THE ARABS.—In the *Deutsche Kolonialzeitung*, No. 47, 1888, Mr. Paul Reichard gives the result of his observations on African slavery. He says in the first place that the native Africans maintain the trade much more than the Arabs, and that both misunderstand the European interference with it. A noteworthy fact is that from 80 to 98 per cent. of the genuine negroes are slaves, none but the chiefs and their relatives being free. Of the semi-nomadic tribe of the Wahähä nearly half the people are slaves; while among the Somalis and the kindred Masai there are almost none. In Igonda, the capital of Ugunda, there were in 1880–1885, 6 freemen in a population of 500 or 600, and in Kakoma, out of 60 or 70 persons, 3 were freemen. In Mr. Reichard's own caravan, composed of 350 men, all but 3 were slaves; and when, on his return march, he was joined by 300 others who wished to take advantage of his protection, only 2 of these were freemen.

It follows that slaves must be well treated, first, because the owner is naturally interested in his property, and secondly, because the slave, if abused, has only to run away and become a slave elsewhere.

The origin of African slavery is to be sought for, not in the oppression exercised by the chiefs, but in the universal insecurity and defencelessness of persons and property, so that the institution is rather a benefit than an evil ; and Mr. Reichard has never heard that any slave had been known to lament his bondage.

Mr. Reichard's reasoning shows that he has kept his nature unspotted from the world, and is more guileless than any one but a slave-owner or a chief. Other men find it difficult to understand how there can be universal insecurity of persons and property without something very like oppression.

The Arabs are not what Mr. Reichard calls slave-dealers. They are, first of all, traders in ivory, who have borrowed money at usurious rates of the Banians, or Indians, in Zanzibar, and find themselves unable to pay their debts.

They take refuge in Central Africa, as other defaulters go to Canada, and begin their slave-business and planting on their own account ; and, being sharp traders, they do well at both. Their ways are intelligible to the negro, but he can make nothing of the Europeans. "They will not let us have slaves," he says, "but they have them. Look at the sailors on their ships ! Those poor fellows eat and drink and sleep at the word of command. They stand up and lie down, they run and they climb, just as they are ordered. We do better than that, for if we don't want to do anything, we leave it alone, and nobody meddles with us. Then the white men take the Arab ships with their slaves on board, that the Arabs bought with their own money, or captured at the risk of their own life ; and the whites must be very

bad men, to carry off the slaves without paying for them."

There is but one way, in Mr. Reichard's opinion, to get rid of slavery, and that is to strip the chiefs of their power, to introduce order and security, and to possess the country. This is intelligible, if not new; but who is to be the possessor?

HUNFALVY.—Dr. John de Hunfalvy, President of the Hungarian Geographical Society, died at Budapest on the 6th of December, 1888, in his sixty-ninth year.

Hunfalvy was a member of the Royal Council, a Professor in the University, and an Associate of the Hungarian Academy of Sciences, and his name was held in honor abroad as well as at home.

The Committee of the Hungarian Geographical Society speak not for themselves alone when they say: "What was perishable in him we confide to the earth, but his spirit will live in his works, even as his memory will endure in the hearts of his friends."

The Eruption of Krakatoa and Subsequent Phenomena. Report of the Krakatoa Committee of the Royal Society. 4to. Trübner & Co., London, 1888.

On the 17th January, 1884, the Royal Society appointed a Committee of Six, with power to add to the number, "to collect the various accounts of the volcanic eruption at Krakatoa, and attendant phenomena." As finally constituted, the Committee consisted of thirteen members.

Their work involved an immense amount of labor, which may be partly appreciated by those who consider

the closing sentences of the preface: "The Committee's first duty (and desire) was to collect facts. This duty we have all tried to discharge, and we have not only collected the facts, but have done our utmost to enable every one to verify them."

It is not in the mass of material thrown out—for in this respect other volcanic eruptions have surpassed it—but in the terrible character of the explosions that the outbreak of Krakatoa appears to have no parallel. Prof. Judd accounts for the peculiarity of the phenomena in this eruption by the situation of the volcano and its liability to great inrushes of the waters of the sea.

Of the ejected material, 5 per cent. was in the shape of compact lava and fragments from the side of the vent, and 95 per cent. consisted of pumice and dust. For more than a year after the eruption (Aug. 26, 1883), vessels sailing the Indian Ocean encountered this pumice, sometimes for days together.

The atmospheric disturbances were registered at fifty-two stations, distributed through the world.

Seven great air-waves were recorded, four outward from Krakatoa as a centre, and three return-waves. The first wave reached New York in 14 hours 35 minutes from the time of its origin, and the second 37 hours 47 minutes later; and, taking the average of all the records, the velocities were from 674 to 726 miles an hour.

To show the distances at which the sounds of the eruption were heard, Gen. Strachey makes a diagram of concentric circles drawn around Krakatoa at intervals of 10°. The 30° line is touched, or nearly approached,

by Ceylon to the N. W., Perth and other stations in West and South Australia to the S. E., New Guinea to the E., and Manila to the N. E. Diego Garcia, in the Chagos group, almost due W. of Krakatoa, and Alice Springs, in South Australia, are beyond the 30° line, and Rodriguez, S. W. of Krakatoa, is beyond the 40° line, or very nearly 3000 miles away.

The account given by Mr. James Wallis, Chief Officer of Police at Rodriguez, is in these words :

“ On Sunday, the 26th, the weather was stormy, with heavy rain and squalls ; the wind was from S. E., blowing with a force of from 7 to 10, Beaufort scale. Several times during the night (26th–27th) reports were heard coming from the eastward, like the distant roars of heavy guns. These reports continued at intervals of between three and four hours until 3 P. M. on the 27th, and the last two were heard in the directions of Oyster Bay and Port Mathurie (Mathurin ?).”

Capt. Wharton, R. N., comes to the conclusion that the sea disturbance was probably composed of two descriptions of waves ; long waves, which alone were marked by the automatic gauges, and came about every hour ; and short waves at irregular intervals, the speed of both being about the same. The velocities varied, according to the depth of the sea and the obstacles offered to the passage of the wave by intervening islands, shoals, reefs, and headlands. Observations are tabulated from 48 stations, 37 of them provided with self-acting gauges. The lowest rate recorded was 39 geog. miles an hour at Soerabaya, 465 geog. miles from Krakatoa. Only three other records show a rate below 50 miles an hour, and in much the largest number the speed was consid-

erably beyond 300 miles. For Colon the calculation gives 606, and for Honolulu 770 ; but Captain Wharton is satisfied that the disturbances noted in the Pacific, as well as at Colon and in New Zealand, had no connection or almost none with Krakatoa.

The optical phenomena caused by the eruption did not entirely fade away until early in 1886.

These appearances were unquestionably due to the action of a haze, composed of dust and vapors mixed, or of dust alone, from the volcano. Many similar instances have been known ; and on pp. 384-401 of the *Report* the Hon. Rollo Russell presents a list of analogous glow phenomena, associated with volcanic eruptions, and recorded between the years 1500 and 1886. Of these notices there are more than ninety.*

To the many descriptions of the Krakatoa sunsets already published may be added the following, taken by *Nature*, of February 21, from Prjeválsky's "Fourth Journey to Central Asia : " "After a bright day which is here (in the Gobi) the usual state of the weather during the winter, light cirrus and cirro-stratus clouds appeared in the west, just before sunset, or immediately after. Probably they were floating all day long in the upper strata of the atmosphere, but became visible when the sun went below the horizon. Immediately after that, the whole of the western part of the sky became lighted by a bright cream light, which soon acquired a violet colour in the upper parts with stripes of shadows. At the same time the shadows of the night rose in the

* Gen. J. Watts de Peyster has found in the *Literary Miscellany and British Review* for 1789 Berthelot's account of the strange skies seen after the eruption of Skaptar Jökull in 1783.

east, dark lilac in the lower parts, and violet in the upper parts. The violet colour vanished by and by in the west, and a segment of bright orange appeared close by the horizon, on a cream back-ground. Sometimes it acquired a light red colour, but sometimes it became bright red or even blood-red. In the meantime the lilac colour disappeared in the east, and all the sky became of a gray-lilac colour. Amidst the changing colours in the west, Venus glowed like a diamond descending beneath the horizon at the time when the twilight, which lasted for about one hour and a half, came to an end. During nearly all that time the glow in the west was casting shadows, and all objects in the desert appeared in a fantastic light. The sunrise was accompanied by the same phenomena, but in a reverse order: sometimes the morning twilight began with the appearance of a blood-red colour. At full noon the phenomena were less striking, and in the atmosphere of the Northern Ala-shan, which is charged with dust, we saw them less often than in the Central and Northern Gobi."

The *Report* is thoroughly well done and admirably illustrated; but why is Cumaná regularly printed *Cumaña*?

International Polar Expedition. Report of the Proceedings of the United States Expedition to Lady Franklin Bay, Grinnell Land, by Adolphus W. Greely, First Lieutenant, Fifth Cavalry, Acting Signal Officer and Assistant, Commanding the Expedition. 4to. Vols. 1 and 2, Washington, 1888.

This work is published by authority of the House of Representatives (the Senate concurring), and must,

therefore, be regarded as the official, definitive Report of the expedition to Lady Franklin Bay.

Leaving out the details of various physical observations, the net result of the expedition was the attainment by Lieut. Lockwood, in Lat. $83^{\circ} 24'$ N., Long. $40^{\circ} 46'$ W., of the highest latitude ever yet reached. This gives a kind of title to distinction and to remembrance.

For the conduct of the expedition, its incidents and the life led by those who belonged to it, as all these are here described, the less said the better. The rumors of strange and fearful things done by the men of the party may be passed over ; but the record published by the commander calls for a word or two. He has survived to tell his own story of his relations with the rest, and the men who never returned from the wilderness have no one to speak for them. This is a misfortune for their memory, and, possibly, a greater misfortune for their commander.

To name but two of them, Private Henry and Dr. Pavy, if they were alive, might have something to say for themselves, and Gen. Greely might find it proper to correct or to modify what he has printed concerning them. Henry seems to have been alone in the world, but Octave Pavy was not without friends. He is remembered by all those who knew him as not more remarkable for his great intelligence and his accomplishments than for his manliness and his honorable conduct.

Gen. Greely's last word about the dead man is that he was a Bohemian. The word is easily written, but it is not always used in a definite sense. The Chief Signal Officer undoubtedly means to say that Pavy was not a

martinet ; and this may be admitted. One statement must be given in the author's own words : " The most unfortunate experience of the month for me was the detection, on December 3, of Dr. Pavy purloining the extra food of Sergeant Elison (*Pavy's patient*). The detection occurred when the party were asleep and in total darkness, and Dr. Pavy was ignorant that I knew of his action." *Report, Vol. 1, p. 74.*

The human infirmities, exasperated by ill-health and privation and the incessant fret of temper under trying conditions, will account for much ; but this story is not to be believed. The charitable explanation of it is that Gen. Greely, himself a sick man at the time, took the figments of a heated brain for facts. It is none the less clear that his papers ought to have been submitted to careful criticism and selection before it was thought proper to publish them in any form under the authority of the Government.

The National Geographic Magazine, Vol. 1, No. 1.

Washington, 1888.

The Washington Society has made an excellent beginning. This first publication is very well printed and illustrated, and the articles, six in number, are all full of interest. President Hubbard leads with an Introductory Address that covers a wide field, and may be called revolutionary in character. It gives a shock to old associations to meet Cyrene on the Nile, exactly under the Tropic, and the allusion a little farther on to the law of Matthews is a trifle dim, for there does not seem to be, at first sight, any direct connection between the fecund.

ity of fish and a Justice of the Supreme Court ; but all men do not see things in the same way.

Prof. Davis's article on "Geographic Methods in Geologic Investigation" is illustrated, in a sense, by Mr. McGee's paper on the "Classification of Geographic Forms by Genesis," though the ideas of the latter suffer under the weight of his vocabulary. In one instance, at least, on p. 36, he has invented a new term : *roches de moutonnées*.

Gen. Greely and Prof. Everett Hayden give the history of the great storm, March 11-14, 1888, with four colored charts, showing the meteorological conditions for each day at noon, Greenwich mean time, one Track Chart, and a Barometer Diagram.

Mr. Herbert B. Ogden reviews the work of the Coast Survey from its creation in 1807, and Mr. Henry Gannett's account of the Survey and Map of Massachusetts closes the number.

Rarely does a new Association show so much promise.

Princeton College Bulletin, Vol. 1, No. 1, January, 1889. *Princeton, New Jersey*.

The *Princeton College Bulletin* is edited by the President and Members of the Faculty, and will deal editorially and through signed articles with the educational questions that affect the general interest. This first number gives, besides the President's address at the opening of the College in September, 1888, a number of notes on literary and scientific subjects. One of these, on p. 23, calls for more ample information. Prof. Frothingham, it is said, has found in the writings of James, Bishop of Edessa (c. 700 A. D.), a passage which

evidently refers to the continent of America. It would be a pleasure to see this passage, if it is couched in language not unworthy of the Episcopal dignity.

Eskimo of Hudson's Strait. By F. F. Payne. Toronto: 1889. Pamphlet, 8vo.

Mr. Payne's pamphlet is an Extract from the Proceedings of the Canadian Institute, and gives the result of his observations during a residence of thirteen months among the Eskimo, and principally those at Cape Prince of Wales.

Their way of life is regular. Two meals a day are taken, one upon rising in the morning, the other just before retiring, and Mr. Payne thinks they waste nothing. They steal with great adroitness, and like nothing better than to find a cache some one has made, when they all go in and eat up the food. Sometimes they return stolen articles, but always expect pay for their honesty and are indignant if it is refused. Cleanliness they hardly know, but they enjoy washing their faces with soap in the warmer weather as a kind of play. They smoke whenever they can, and prize tobacco very highly.

They are of a merry disposition and are always ready to laugh. At the same time, their amusements are few; throwing the harpoon at a mark, wrestling and running, and a game something like a tilting-match. In a snow-house built for the purpose, with a central pillar, an ivory ring is suspended from the roof, and the men try to put their spears through it as they walk quickly round the pillar. During Mr. Payne's stay, foot-ball was introduced, the ball being a walrus-bladder covered with leather. Men and women took part in the game,

the latter with their children on their backs. The girls have their dolls, made of sticks, and play at keeping-house and giving dolls' parties.

The Eskimo has generally but one wife and seems to be careful in providing for his family. A curious custom on the Strait is that if a married man is considered to be worthy of death for some offence, the one who accepts the office of executioner assumes the care of the criminal's wife and children. Ugaluk, one of Mr. Payne's men, had a second wife who had come to him in this way.

The Eskimo believe in a heaven and a hell, the former the abode of those who tell the truth in this life, while the liars are sent to hell. Heaven is where the sky and earth meet, to the southward, a place where there is no snow and plenty to eat, without any work; but in hell it is very cold, with continual snow, and hard work. Ugaluk said that his people offered up prayers, but Mr. Payne never saw this done. The dead are buried along the coast, a favorite place being an island to which the foxes and wolves have no access. Monuments, sometimes ten feet high, are built over the graves, and offerings are made to the departed.

Mr. Payne found two cannons on the shore near Cape Prince of Wales, and in them a number of bullets, shot and rubbish, put there, he was told, for the use of the spirits.

The Unknown Horn of Africa. An Exploration from Berbera to the Leopard River. By F. L. James, M.A., F.R.G.S. With Additions by J Godfrey Thrupp, M.R.C.S. Map and Illustrations. London, 1888.

Mr. James's party, composed of 10 Europeans and

20 Somalis, started from Berbera, the Somali port on the Gulf of Aden, at the end of November, 1884, for the interior. The farthest point reached was a little beyond Barri, about 350 miles from Berbera, in a direction W. of S. The return was along a line, nowhere more than 65 miles to the W. of the first.

The objects of the Expedition were principally sport and science, with an eye to commerce in the future, Mr. James expressing the hope in his preface that the direct British influence, "if not territory," may at no distant date extend from the land he and his companions were the first to explore to the present southern boundary of the British East African Company's Country. If the Somalis offer no objection to the fruition of this hope, other men may well be satisfied.

The journey is described in a lively and entertaining style. Some time before starting Mr. James met Sir Richard Burton and quoted to him the advice given by M. Antoine d'Abbadie, a most experienced East African traveller, in the words: "Feel your way, but never tell where you are going." "Do nothing of the kind," said Burton, in his direct, if not high-bred English: "Give out your goal at once, and don't attempt to dodge niggers." Mr. James followed Burton's rule and thinks well of it. The other rule may have been as good, but the anecdote is worth remembering as an illustration of the value of experience.

Each Somali, when he signed the contract for the journey, bound himself by oath *to divorce his wife*, if he failed to keep his engagement, and Mr. James was assured that this tremendous obligation would hold a

Somali when nothing else would. The men behaved fairly well throughout the journey.

Things were less pleasant with the native tribes. These were all eager to turn an honest penny by begging, or, if that failed, by threatening violence ; but vigilance and firmness carried the travellers through with safety. The medicine-chest was also a great blessing, for the Somalis will take anything in the way of drugs.

Mr. James saw quite enough to convince him that the explorer in Somali-land should be always on his guard.

The natives, he believes, are not to be trusted ; but he does not report the native opinion of the Europeans. He and his party must have been wonderful to men who knew nothing of tobacco and fire-arms.

For about 70 miles, as far as Burao, the road was an ascent to the edge of a table-land, the Haud, which affords no water in the winter season for a distance of more than 200 miles. The camels travelled this long way in thirteen days, without drinking a drop of water until they reached the wells of Gerloguby. These wells were dug in the solid rock, no one knows when or by whom ; and beyond them the country was more promising.

At Barri, on the Leopard River (Webbe Shebeyli), the land was covered with flocks and herds, and the trees were magnificent.

The people were no longer Somalis, but a race of negro type, called Adone, and described as diabolically ugly, and only the rulers were of Somali blood. Mr. James accepts the story told him that the Somali conquerors were driven out, but that some of them were

allowed to remain and rule the country ; an arrangement which implies magnanimity on both sides, or extreme innocence on one.

The illustrations, some of them beautifully colored, and the Appendix with its very full descriptions of animal and plant life, add greatly to the value of the work.

Christophe Colomb, Français, Corse et Calvais, Etude Historique sur la Patrie du Grand Amiral de l' Océan, par l' Abbé J. Peretti, de Muro. 8vo.

Paris et Bastia, 1888.

The Abbé Peretti says in his preface that he believes his readers will be convinced :

"1. That no historical question is surrounded with more uncertainty and *mystery* than the question of the origin of Christopher Columbus ;

2. That this mystery constitutes a relative proof in favor of Calvi as his birthplace, a spot which, furthermore, has the *strongest probabilities* on its side ;

3. That the unconscious testimony of Giustiniani, of Foglietta and of Casoni, does away with all uncertainty on this point, and proves, with all the clearness that can be asked for in history, that Christopher was a Corsican and a native of Calvi."

Credo quia absurdum.—The readers who are convinced of the first proposition must be confounded by the last ; and if, as the second proposition maintains, the mystery is a proof, what does any man want with probabilities or unconscious testimony ?

The Abbé has but lately become a citizen of Calvi, and the zeal of his house hath eaten him up.

There are 500 pages in his book, and much fine writ-

ing, but there is not one argument that will bear examination. He puts his own meaning on allusions and obscure references, and this he has a right to do; but his reader has also a right to reject his meaning.

Mr. Peretti's conclusion bears unconscious testimony to his lack of appreciation of what constitutes evidence: "In laying down the pen, we believe that there is but one way to dispute the claim of the little city of Calvi to the honour of having given birth to Christopher Columbus; and that is to produce the registration of his birth, or *something equivalent*, as we ourselves have done."

We shall know much more about Columbus within the next few years; and, since it is certain that a man must be born somewhere, it is quite possible that evidence may be brought to light to prove that the great Admiral was born in Elba, or in Corsica, or, perhaps in Paris.

Whatever may have been his birthplace, men will continue to believe that he was an Italian, in spite of the book on which the Abbé Peretti has wasted so much time and labor.

TITLES OF PAPERS IN GEOGRAPHICAL JOURNALS.

AMSTERDAM.—*Kon. Nederlandsch Aardrijkskundig Genootschap, Tijdschrift.*

The Island of Urk (in the Zuyder Zee)—The Boundary Between the Netherlands Territory in Borneo and that of the North Borneo Company—Communications relating to the Scientific Examination of the Key Islands and of Flores—A Letter of Van der Kellen's on Gambos (Angola) and Its Inhabitants—Dr.

H. F. C. Ten Kate's Letter on His Visit to New Mexico and Mexico.

BERLIN.—*Gesellschaft für Erdkunde, Verhandlungen der.*

Land and People in Ancient and Modern Egypt—
The Settlements and the Trade of the Morea
—A Festival of the Dead among the Bororó
Indians—The Surface Formations of the Congo Basin.

Mittheilungen von Forschungsreisenden und Gelehrten aus den Deutschen Schutzgebieten.

Reports from the Togo Country : by Von François, Puttkamer, Wolf and others ; Measurements of Elevations by the Wolf Expedition, Meteorological Observations at Adadó (Bismarckburg, 220 miles from the coast and 2330 feet above the sea)—Reports from the Kamerun Region, by Zintgraff, Tappenbeck, Weissenborn and Braun, on the Cultivation of European Vegetables, the Zoological Results, etc.—Journey in the Back Country of Togo-Land ; Measurements of Elevation and Determinations of Latitude—Zintgraff's Expedition to the Source of the Calabar, or Grand River—Remarks on the Map of the Route from Barombi Station to Banyang (Kamerun)—Kund's Expedition—Report of Meyer and Baumann in Usambara (East Africa).

Deutsche Kolonialzeitung.

Events in German East Africa—The Emin-Pasha Movement—Kilua in 1506–1508—The Blockade of the East-African Coast—African Slav-

ery and the Arab Rule—Santa Fé in the Argentine Republic—The Rescue of the *Employés* of Lewa—The Apostolic Vicariate of the Nyanza Lake—The Relations of the Togo Region—German Vitu - Land—German and English Settlements—The Debate in the Reichstag—The Slave Trade in the Red Sea—A Practical Glance at Quinine—The Troubles in Samoa—German Planters for the German Colonies—An "Accession Treaty" with Zanzibar—Karema (on the Eastern Shore of Lake Tanganika)—Bolivia—Against the Slave Trade—Prohibitory Duties on the Niger—Documents Relating to the Rising in East Africa—Right Across Africa under the German Flag.

BOSTON.—*Appalachia.*

Ypsilon Peak (Colorado)—Two in the Alpine Pastures—Mountains Near New Zealand Notch—The Crater of Mt. Misery, St. Kitts—On Snow-Shoes at Jackson—An Exploration in the Pilot Range—Some Adirondack Paths.

BRUSSELS.—*Société Royale Belge de Géographie, Bulletin.*

A Scientific Expedition to the Caucasus—An Excursion in Campine (region between Antwerp and Limburg)—Colonization and Emigration.

Le Mouvement Géographique.

The Belgian Enterprises on the Congo—The Conquest of the Congo: the Story of Ten Years, 1878–1888—The Stanley Expedition—The News From Stanley—The Problem of the Lukuga—The Question of the Lomami—The

Ivory Trade—Count Teleki's Explorations in Africa—The Congo Railroad.

BUENOS AIRES.—*Instituto Geográfico Argentino, Boletín.*

Exploration of Patagonia—The Map and Atlas of the Argentine Republic—Expedition to the Province of Matto Grosso (sent out by the Geographical Society of Rio de Janeiro in May, 1888).

EDINBURGH.—*Scottish Geographical Magazine.*

Sketch of the History of Telegraphic Communication between the United Kingdom and India—Journey in the Vice-Consular District of Chiengmai (in the Lao country, 400 miles N. N. W. of Bangkok)—The Inland Ice of Greenland—Obituary (Jacques de Brazza)—Note on the Karun River, Persia—The Andamans and Andamanese—Preliminary Note on the Geological Structure of the Sindang-Barang District, on the South Coast of Java—The Transvaal, or South African Republic—The Philippine Islands.

GOTHA.—*Petermanns Mittheilungen.*

On the Chalk Region near the Pyramids of Gizeh (Dr. Schweinfurth)—General Prjevalsky's Fourth Journey of Exploration in Central Asia—The Formation of Transverse Valleys—The Mean Height of the Land and the Mean Depth of the Sea—The Geographical Distribution of Mean Wind-Velocity in the United States—The Universal Adoption of the Gregorian Calendar—The Division of River Regions by the Principal Water-Shed of the Earth—Clima-

tological Observations in Costa Rica up to 1888—Ratios of Temperature on the North-eastern Coast of Labrador—Usambara.

LONDON.—*Royal Geographical Society, Proceedings.*

The Niger Delta—The Key, or Ké, Islands (S. of Dutch New Guinea)—A Note on the Conservative Action of Glaciers—A Journey to Southern Morocco and the Atlas Mountains—A Visit to Sheshouan (60 miles S. of Tetuan, Morocco)—A Journey from British Honduras to Santa Cruz, Yucatan—Nilometers—Journey from Natal to Bihé and Benguella, and thence across the Central Plateau of Africa to the Sources of the Zambesi and Congo—Further Exploration in the Regions Bordering upon the Papuan Gulf—Note on the Origin and Orthography of River Names in Further India.

Nature.

Prjevalsky's Fourth Journey to Central Asia—The Coral Reefs of the Peninsula of Sinai—How Rain is Formed—The Earthquake at Ban-dai-San, Japan—The Law of Storms in China—A Volcanic Sea-Wave (N. of New Guinea, March 13, 1888)—The Earthquake at Edinburgh (Jany. 18, 1889)—The Report of the Krakatao Committee of the Royal Society.

MADRID.—*Revista de Geografía Comercial.*

Spanish Immigration into the Philippines—The Island of Paragua—The Western Sahara—Fighig and the Moorish-Algerian Frontier—Spain in the Gulf of Guinea—The Importance

and the Future of the Mariana (Ladrones) Islands—Commerce and Caravans in the Western Sahara—The Congo Free State—Foreign Commerce of Spain—Geographers in the Ministerial Departments—Questions Concerning the Philippines—The Province of Vizcaya—Blockade of the East African Coast—Spanish and Portuguese Wines in Germany—Museum of Agriculture and Forestry in Lisbon—Chambers of Commerce—The Treasures of the Incas—The Muni Question (between Spain and France concerning territory on the African coast near the Gaboon)—The Province of Coruña—The Trade of Japan with Spain and the Philippines.

MANCHESTER.—*Manchester Geographical Society, Journal of the.*

A Recent Journey from Lamu to Golbanti in the Galla Country—The Heart of Europe as viewed from a Railway Train, with Notes of a Visit to Constantinople and Other Places in the Ottoman Empire—Victoria—Water Supply to Large Towns—The Arabs in Central Africa—Notes on the Nyassa Region of East Africa—Correspondence—Portugal and Africa—Manchuria.

MILAN.—*L'Esplorazione Commerciale.*

Lessons in Commercial Geography—Emin Pasha and Capt. Casati—The Western Sahara—Correspondence: S. Paulo (Brazil) and Suez—Santa Fé (Argentine Republic) and Its First Census—The Bamboo—Roman Letter—Tu-

nis—The Future of the Italian Lemon in America—Colonial Massowah—African Notes—Trade in Liquors in Northern Africa—Principal Products of Central Africa.

NAPLES.—*Società Africana d'Italia, Bollettino.*

African Questions—Slaves in Africa—The Anti-Slavery Committees—Africa at War—A Visit to Lavigerie—Emin Pasha and Capt. Casati.

NEW YORK.—*Science.*

French Kongo—The Development of Commerce on the Kongo—Africa, Its Past and Future.

PARIS.—*Société de Géographie, Bulletin.*

Report made the 15th April, 1888, on the Competition for the Annual Prize—Journey across the Western Sahara and Southern Morocco, by Camille Douls—New Researches on the Origin of the name of America (Jules Marcou)—Gen. J. T. Walker's Letter on Dutreuil de Rhins's Notice of Tibet, and Reply of M. Dutreuil de Rhins—The Geographical Distribution and Density of Population in France—The Euphrates Valley Railway—The Island of Réunion.

Compte Rendu.

Ascent of Mt. Ararat—The Dome of the Rock (at Jerusalem)—François Bernier (the Oriental Traveller)—Journey to the Salt Mines of Iletzk (40 miles S. S. W. of Orenburg)—Semionoff's Journey in Turkestan—The River Whémé (the boundary between Porto Novo and Dahomey)—The Lake Liba Country—Identification of the Hydrographical Basin

of Central Tunisia with that of the ancient Triton—Map of Cambodia and Dictionary of the Khmer Language—Journey to Bambook and Foota-Jallon—The Origin of the name Sfax—The Hemenway Archæological Expedition—A Manuscript of D'Alembert's—The Prime Meridian (of Jerusalem)—M. Varat in Corea—Capt. Binger in the Western Sudan—Itineraries of the Congo region—Climate and Races of Western Africa (by M. Paul Barret)—France under the Valois and the first Bourbons—Map of the Caucasus—The Transcaspian Railway—The Map of Madagascar—Alsace, the Country and Its Inhabitants—The Dynamometer of the *Hirondelle* (the Prince of Monaco's Yacht.)

RIO DE JANEIRO.—*Revista do Observatorio.*

The Climatology of Brazil.

ROME.—*Società Geografica Italiana, Bollettino.*

Excursion into the Gimma Country (S. Abyssinia)—Volcanoes and Earthquakes in the Isthmian Region of Central America—Letter from Harar—Six Months in Madagascar—Emin Pasha and Capt. Casati—Barret's History of the Western Sudan—On the Meaning of the Word *Pendenza* (slope)—A Lunar Rainbow and Fata Morgana—Galli's Map of Italy—From Cucuhy to Manaos—Explorations of Borelli (in Abyssinia)—An Excursion in Basutoland—Roblet's Map of Madagascar—The Province of S. Paulo (Brazil)—Studies for the Columbus Collection (now making for the year 1892).

TURIN.—*Cosmos.*

Report of the Italian Vice-Consul at Montevideo on the Condition of Uruguay—Nachtigal's Travels in the Sahara and the Sudan—The Second Expedition of von den Steinen to the Xingu—Younghusband's Journey from Manchuria to Kashmir—From Assab Bay to Shoa.

VIENNA.—*Kais. Königl. Geographischen Gesellschaft, Mittheilungen der.*

On the Regularly Recurring Variations of Surface in Lakes and Enclosed Seas—The Climatic Conditions of Silesia—The Religious Conceptions of the Ilocans (in the Island of Luzon)—Remarks on the Map of the Middle Congo—Annam and French Cochinchina—A Description of the Aurora Borealis from the 12th or 13th Century.

Deutsche Rundschau für Geographie und Statistik.

Mountains and Rivers of the Lands in the South of the Hawash—Athens—The Arabs in Central Africa—Contributions to the History of the Development of Cartography—Conversations with Stanley (by Paolo Mantegazza)—Trade-Routes for the Commerce of the World—The Bosnian Dwelling—Settlements of the Germans in the Country described by Tacitus in his *Germania*—The German Language in Southern Brazil.

WASHINGTON.—*National Geographic Magazine.*

Introductory Address by the President—Geographic Methods in Geologic Investigation—Classification of Geographic Forms by Genesis

—The Great Storm of March 11 to 14, 1888—
The Survey of the Coast — The Survey and
Map of Massachusetts.

WASHINGTON LETTER.

WASHINGTON, MARCH 15, 1889.

THE CENSUS OF THE UNITED STATES.—The Act providing for the eleventh Census (1890), passed during the last hours of the 50th Congress, seems to create a *permanent* office in the Department of the Interior, to be denominated the Census Office. A chief officer is to be appointed by the President of the United States, to be called the Superintendent of Census, whose duty it shall be to superintend and direct the taking of the eleventh Census, "*and to perform such other duties*" as may be required by law. The annual salary of this office is fixed at \$6,000.

The Act prescribes and limits the scope of the next Census to an enumeration of the population ; social statistics relating to the population ; statistics relating to the products of manufactories ; agricultural and mining industries ; mortality and vital statistics ; valuations and public indebtedness ; recorded indebtedness of private corporations and individuals ; statistics relating to railroad corporations ; incorporated express, telegraph and insurance companies ; and, finally, a list of the names, organizations, and length of service of surviving soldiers, sailors and marines in the War of the Rebellion, and the widows of such soldiers, sailors and marines.

Compared with the subjects enumerated in the Census of 1880, this arrangement would seem to eliminate the

following: forestry, ship-building, newspapers, petroleum, coke, building-stones, precious metals, water-power, wages, strikes, defective and dependent classes, power and machinery employed in manufactures, ice industry; and to *add* insurance statistics and a list of surviving soldiers, sailors and marines (and their widows) of the late war. It is also provided that there shall be an inquiry as to the number of negroes, mulattoes, quadroons and octoroons; and from official sources information relating to animals not on farms. The topics in the last Census which are to be omitted in the new were most of them ably and exhaustively treated; so that, with the means within the reach of almost any one, they can be applied to conditions of later date. The *new* matter therefore introduced into the eleventh Census may be considered an extension of the great Census of 1880. Exclusive of printing, engraving and binding, the cost of the Census is limited to \$6,000,000, of which amount \$1,000,000 are appropriated by the present Act.

A descriptive table of former census publications will be found of interest:

Census of.	No. of Vols.	When Published.	Title of Volume.
1790	1	1792.	1. Return of the whole number of persons within the several districts of the United States.
1800	1	1801.	1. Same title as last.
1810	2	Not stated.	1. Aggregate amount of each description of persons within the United States, etc.
		1813.	2. A series of tables of the several branches of American manufactures, exhibiting them in every county of the Union, so far as they are returned in the reports of the marshals and of the secretaries of the territories and of their respective assistants in the autumn of the year 1810, etc.

1820	2	1821.	1. Census for 1820, etc.
		1823.	2. Digest of accounts of manufacturing establishments, etc.
1830	1	1832.	1. Fifth census or enumeration of the inhabitants of the United States.
1840	4	1841.	1. Compendium of the enumeration of the inhabitants of the United States, etc.
		1841.	2. Sixth census or enumeration of the inhabitants of the United States.
		1841.	3. Statistics of the United States, etc.
		Not given.	4. Census of Pensioners for Revolutionary and military services, with their names, ages, and places of residence, etc.
1850	4	1853.	1. The seventh census of the United States.
		1854.	2. Statistical view of the United States.
		1855.	3. Mortality statistics of the seventh census.
		1859.	4. Digest of the statistics of manufactures.
1860	4	1864.	1. Population.
		1864.	2. Agriculture.
		1865.	3. Manufactures.
		1866.	4. Mortality and miscellaneous statistics.
1870	4	1872.	1. Compendium.
		1872.	2. Population and social statistics.
		1872.	3. Vital statistics.
		1872.	4. Wealth and industry.
1880	24	1883.	1. Statistics of population.
		1883.	2. Statistics of manufactures.
		1883.	3. Statistics of agriculture.
		1883.	4. Agencies of transportation.
		1884.	5. Cotton production in the U. S., part 1.
		1884.	6. Cotton production in the U. S., part 2.
		1884.	7. Valuation, taxation and public indebtedness.
		1884.	8. Newspapers, Alaska, Ship-building.
		1884.	9. Forest trees of N. America (with an atlas).
		1884.	10. Petroleum, coke, and building-stones.
		1885.	11. Mortality and vital statistics, part 1.
		1886.	12. Mortality and vital statistics, part 2.
		1885.	13. Statistics and technology of precious metals.
		1885.	14. Mining laws of the United States.
		1886.	15. Mining industries of the United States.
		1885.	16. Water power of the United States, part 1.
		1887.	17. Water power of the United States, part 2.

- 1886. 18. Social statistics of cities, part 1.
- 1887. 19. Social statistics of cities, part 2.
- 1886. 20. Wages, prices of necessities of life, trade societies, strikes and lockouts.
- 1888. 21. Defective, dependent and delinquent classes.
- 1888. 22. Power and machinery employed in manufactures and the ice industry.
- 1883. 23. Compendium, part 1.
- 1883. 24. Compendium, part 2.

It will be observed that many volumes (fully half) of the Census of 1880 were published five, six, seven and even eight years after date. This delay was not so much the fault of the collaborators as of Congress in dealing out insufficient appropriations to pay for the printing. On two occasions the work absolutely came to a standstill, although the material was in the printers' hands. Let us hope that the results of the eleventh Census will be fully known before the dawn of 1900.

ALASKA.—The expeditions sent out by the United States Coast and Geodetic Survey for a number of years past to survey the coasts and waters of Alaska have made contributions of much value to our knowledge of the country, the resources of which are but just beginning to be developed.* A steamer for surveying purposes has been sent to south-eastern Alaska during 1885, 1886, 1887 and 1888. As one result of these and previous surveys, forty-five charts of Alaskan harbors have been published.

Prof. George Davidson,† who for more than twenty years has made Alaska and its vicinity the subject of very close study, urges the necessity of liberal appropriations "for the purpose of charting the dangers of the

* F. M. Thorn, in Bulletin No. 2, U. S. Coast and Geodetic Survey.

† Bulletin No. 4, U. S. Coast and Geodetic Survey.

wild and rocky coasts of that region, to determine the currents along an intricate and curving seaboard, to determine geographical positions, to survey the approaches to all harbors of refuge, to suggest proper aids to navigation, and to determine the limits and depths of the fishing banks. He has ascertained that the cod fishing banks of Alaska are *four times the area of those in the region of Newfoundland*. The eastern part of Behring Sea is a "mighty reservoir of cod," the area within the limits of fifty fathoms depth being no less than 18,000 square miles. In this sea, fishing must be done as it is done off Newfoundland—without harbors of refuge but in much less depth of water. The fishing banks along the south coast of Alaska bordering the Gulf of Alaska, and south of part of the Aleutian chain will add not less than 45,000 square miles, making a total of 63,000 square miles, with an average depth of fifty fathoms of water. If the fishing limits are extended to 100 fathoms, the area of the fishing banks will be increased to not less than 100,000 square miles.

The salmon throughout Alaska are much more numerous than in the waters of California, Oregon and Washington. In some localities the salmon are crowded so thick that the progress of a boat is impeded by them, and in case of a sudden south-east storm the fish are driven on the beach in innumerable quantities. A Russian navigator asserted, in 1867, that "under such circumstances he had seen the beach strewn two and three feet deep with stranded salmon." Mr. Davidson, from personal experience, pronounces the Chilkah salmon the highest colored and finest flavored on the Pacific coast. "There is no such field on this earth as these Alaska

waters for this fishing development ;" and he asserts that Alaska is an inexhaustible store-house of wealth in its fisheries, forests and minerals.

COLUMBIA RIVER.—A description and map of the Columbia River from the Dalles to Celilo accompanies a recent Report of the Board of Engineers constituted by the Secretary of War to examine the obstructions to navigation in that river. It is stated that the Columbia River is navigable for deep sea vessels for a distance of about 100 miles from its mouth. The next stretch of 100 miles, interrupted by the Cascades Rapids affords boat navigation with a minimum depth of eight feet. Above Celilo the low water depth on bars is about four feet, and the river is navigable to Priest's Rapids, a distance of nearly 200 miles. The obstruction of Priest's Rapids puts an end to navigation, but it is almost certain that this obstruction is susceptible of improvement for navigation. It is the announced policy of the Oregon Railway and Navigation Company to run boats on the Clearwater, Middle Snake and Columbia River above Priest's Rapids as soon as regions along those parts of the rivers become settled.

The Board of Engineers recommend the construction of a single-track portage railway from Celilo to The Dalles.

At a recent hearing before a Committee of Congress, Dr. J. W. Powell made some interesting statements in regard to the development of his plans for the irrigation of the arid regions. Pointing on a map to a river in New Mexico known as the Jemes, which is an affluent of the Rio Grande, he remarked that it was called a creek below and a river above, nearer the sources ; and

he said that more than half, perhaps two-thirds, of all the rivers of the arid regions that head in the mountains run out into the desert plains or valleys, and are lost in the sand ; but all the rivers, even those which carry their waters to the sea, diminish very greatly from the point where they leave the mountains to the point where they reach more humid lands below.

Speaking of measurements he said : " We measure water by acre feet. This is something devised during the last season. It was found that people did not understand the ordinary terms of measurements, and so a new unit was devised, and it has come into use within the last five or six months through the technical journals and has been adopted by the people of the west. An "acre foot" of stationed water is an acre of water a foot deep. An acre foot of water will *on an average* in the United States irrigate for the season an acre of land. The storage reservoirs are to be made simply by constructing a dam. In reply to the question whether the Government should build the dams, he said his idea was that the Government should make the surveys, select the lands to be irrigated and the sites for reservoirs and canals, and reserve them so that they should not fall into the hands of individuals to be held for speculative purposes, and then let anybody who wants to, build the dams and canals. An acre of land irrigated is at once brought up from nothing to the value of thirty to two hundred dollars. There are eight States and Territories where agriculture is wholly dependent upon irrigation, and there are six other States and Territories chiefly dependent upon it.

Dr. Powell declined to increase his estimate of one

year's appropriation from \$350,000 to \$500,000, on the ground that he could not find the men to do the work.

Not the least among the benefits to be derived from this irrigation investigation is the stimulus and aid it affords to the topographical survey and the mapping of the Territories and States. It will shorten this great work by many years, for the reason that Congress is disposed to provide liberally for irrigation, while a recognition of the importance of topographical maps wins its way inch by inch.

SKY CHARTS.—The Government of the United States was represented at the Astro-Photographic Congress held at Paris about two years ago, when it was decided that the work of charting the sky by photographic process should be begun. A few of the Governments had pledged, in advance, their support of the plans to be agreed upon, and most of the others have since provided the necessary means. It was assumed that the part of this plan of astronomical photography assigned to the United States would devolve upon the Naval Observatory, and Congress has been asked to appropriate \$50,000 for buildings, instruments, mountings and material.

PRECIOUS METALS.—The gold product of the United States for 1888 is reported at 1,644,927 fine ounces, of the value of \$33,644,927, being an excess of \$175,000 over 1887. The silver product was 45,783,632 fine ounces, of the commercial value of about \$43,000,000, an increase of 4,515,328 fine ounces over 1887. In addition, about 10,000,000 ounces of silver were extracted from foreign ores and bullion. The average price of

silver was about 94c; the average bullion value of the dollar, 72.6. The estimated consumption of gold and silver in the industries during 1888 was: gold, \$14,600,000, silver, \$3,280,000.

ARGENTINE REPUBLIC.—The boundary question between Chili and the Argentine Government, according to late intelligence from Buenos Aires, still remains unsettled, but the negotiations for determining the line which divides the two countries are quietly proceeding within the stipulations of the 23d of July, 1881. The settlement of the limits controversy between the Argentine Republic and Brazil has been referred to a joint commission, which with a technical staff of assistants has been at work for more than a year in the exploration of the disputed territory in the Misiones. The only doubt which arose was in reference to the identity of the Rivers Santo Antonio and Iguazú, maintained by the Argentine commissioners and denied by the Brazilians; and it is thought that an understanding has now been reached on the subject.* In regard to the boundary question between Bolivia and the Argentine Republic, nothing has been done during the past year, both governments maintaining the existing *status quo* in the most friendly manner.

* The dictionaries on both sides support the Argentines. Saint-Adolphe's *Diccionario Geographico, etc., do Brazil* (Lopes de Moura's edition), describes the Santo-Antonio as follows: "A small river in the Province of S. Paulo. It rises near the source of the river Pepiri and unites with the river Curitiba, or Iguacú, 20 leagues above the falls of the Funil." Four leagues beyond this fall, the Iguacú empties into the Paraná.

Paz Soldan, in his *Diccionario Geog. Estadist. Nac. Argentino*, says of the Iguazú: "It is full and navigable as far as the famous Victoria Fall, which is among the highest in the world (197 feet). . . . It rises in the mountains of S. Paulo in Brazil, and forms the boundary with that country from the San Antonio mouth to the junction with the Paraná." (G.C.H.)

The Argentine Republic appears to be on the road to national prosperity. Political quiet pervades the country. Revolutions and attempts at revolutions are matters of the past. The guarantees of the Constitution having the sanction of the people, the laws are permitted to be peacefully executed. The new President, in his late message to the Argentine Congress, said: "My policy has been peace, toleration and conciliation; the fullest liberty for the expression of public opinion, and the free exercise of personal rights." The Government encourages immigration from Europe, the last Congress having voted 50,000 passages to be advanced to agriculturists and artisans intending to settle in the country. The Commissioner of Immigration is said to be having grand success in Europe with the poorer classes. The American Consul, however, entreats his countrymen not to try their fortunes there, "where everything is so different and so primitive compared with what they have enjoyed at home."

Government concessions have largely stimulated the construction of railroads in the Republic. Thirteen guaranteed roads represent a total length of 5770 miles, but numerous applications for new lines without such guarantees have lately been made.

The inter-provincial commerce of the country by river has increased from \$27,502,468 in 1881, to \$73,821,583 in 1887. Progress in agriculture is very marked. In several leading crops the surplus for export is advancing in rapid ratio, the shipments having increased from 145,224 tons in 1882, to 706,254 tons in 1887.

CHEROKEE TONGUE—The Director of the Bureau of Ethnology of the Smithsonian Institution has adopted

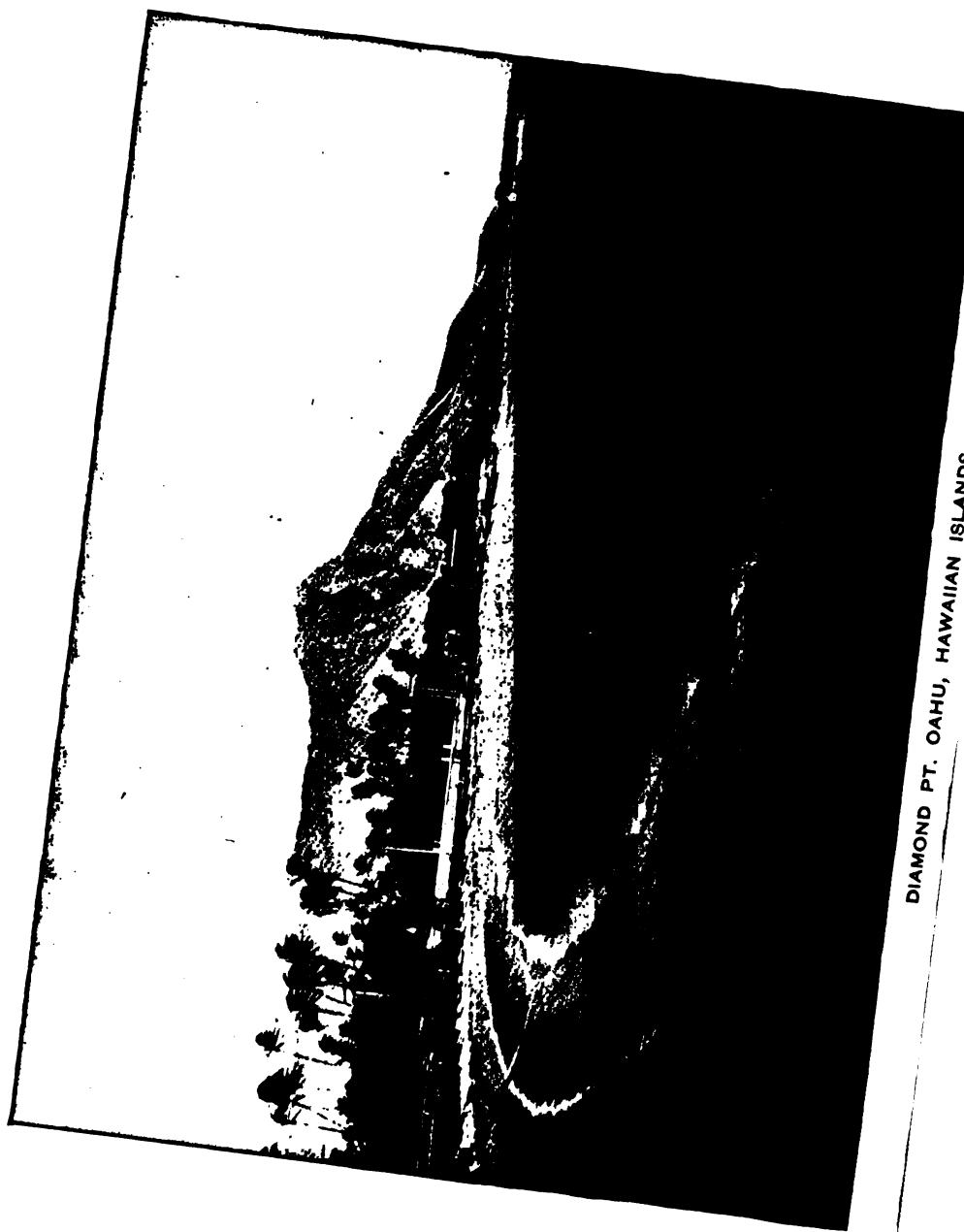
the conclusion of a number of the members of that Bureau, that the Cherokee language belongs to the Iroquoian stock. This has hitherto been considered an open question.

AMERICANS IN CHINA.—The total number of American citizens resident in China in 1888 was 1022, of which number 28 were diplomatic and consular, and 506 were missionaries.

TOBAGO.—The annexation of the island of Tobago to Trinidad took effect January 1, 1889.

H.





DIAMOND PT. OAHU, HAWAIIAN ISLANDS

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THE HAWAIIAN ISLANDS,
THEIR GEOGRAPHY, THEIR VOLCANOES, AND THEIR PEOPLE.

BY

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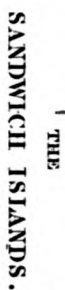
The Hawaiian Islands were discovered in the year 1542 by the Spanish navigator Juan Gaetano. Traces of this early visit may be found in a Spanish map of the sixteenth century which indicates the place of the islands, though somewhat incorrectly as to their longitude; and also in the lighter complexion and hair of some of the natives, which seem to indicate the crossing of their ancestors with European blood. Since the re-discovery of the group by Captain Cook in 1778 it has been generally known as the Sandwich Islands, a name conferred upon them by Captain Cook, in compliment to the British Lord of the Admiralty at the time. The Islanders themselves called their country *Hawaii* (Hä-vi-ē) from the name of the principal island, the *W* noting a sound more nearly akin to that of *V*. The native name is thought by Fornander to be cognate with Java, and to indicate an early residence of the race in the East Indies. From

Hawaii comes our English-formed adjective *Hawaiian*, used to designate the group.

Where are these islands situated? Not in the South Pacific, as is thought by many who have not searched for them upon the map, but in the central Northern Pacific, close upon the tropic of Cancer, and about one-third of the distance on a great circle drawn south-westward from San Francisco to New Guinea. They are the most northerly of the dozen groups that are the habitat of the true Polynesian race. Their area is about 6,100 square miles; two-thirds of this are included in the principal island of Hawaii, which has about the same area as the State of Connecticut. Twelve islands are usually named as composing the group: four larger and four smaller, all inhabited, and four barren rocks; but besides these a string of scattered rocks and reefs extends far to the north-west of the group properly so-called. The islands occupy the segment of a circle convex towards the north-east, its chord having a length of about 400 statute miles. (Dutton.)

From San Francisco the distance to Honolulu, the capital, is about 2,100 miles; the Pacific Mail steamers make the trip in seven days, so that the islands are now within less than a fortnight's journey from the city of New York.

Except for the coral reefs that are found among them, the group is entirely of volcanic formation. The islands appear to have been thrown up in successive order from the north-west to the south-east, the most ancient of the group being Kauai, upon which volcanic action ceased many centuries ago. Upon the next large island, Oahu, the soil is usually less deep and the erosion of the craters is



not so marked. Honolulu, the capital, a beautiful town of 20,000 inhabitants, is situated upon this island of Oahu. On Maui, the next island toward the south-east, the signs of volcanic action are more recent ; and here we find Haleakala, the greatest extinct crater in the world, a vast V-shaped chasm some eight miles in length and twenty-five or thirty in circuit. On this island the traces of volcanic action are comparatively recent ; yet no tradition exists among the natives of any eruption.

Coming farther to the south-east, the terminal member of this chain of islands, Hawaii, has the greatest active volcanoes in the world. The summit crater, Moku-a-weo-weo, and the lateral crater, Kilauea, upon the flanks of the mountain, Mauna Loa, are familiar to my readers as the sources of the mighty eruptions which at varying intervals burst forth and at once devastate and create the land. Hawaii is an island still in process of formation ; and Mauna Loa has made its present altitude of 13,760 feet entirely by the successive flows of enormous streams of extremely liquid lavas. The neighboring mountain, Mauna Kea, is a vast mass of long-extinct craters, of which the highest point surpasses the elevation of Mauna Loa, rising to the height of 13,953 feet ; but the mass of the mountain is less than that of Mauna Loa, its base being smaller and its slopes less gentle. The island of Hawaii is built upon the ocean floor at a depth of about 18,000 feet, its submarine slopes corresponding closely to the subaërial ; its mountains thus rise not far from 30,000 feet above the ocean floor. The mass of these volcanic domes is unequalled. Professor Dana estimates the bulk of Mauna Loa above the sea-level as not less than 125 times the

bulk of Vesuvius ; and owing to the immense extent of its base, its mass is greatly in excess even of the much higher volcanic cones of South America. The mass of Mount *Ætna*, *Shasta*, *Ranier* and *Hood* together, would be inferior to that of *Mauna Loa*, which is the largest of active volcanic mountains in the world.

The eruptions of this great mountain are unparalleled, at least in historic times, both as to duration and as to magnitude. There have been greater single catastrophes, notably that of *Krakatoa* in 1883, when it is estimated that a cubic mile of mountain was hurled into the air, and an air-wave caused by the convulsion, as indicated by self-registering barometers at scores of different stations, was transferred three times around the entire circumference of the earth within eleven days.

The eruptions of *Kilauea* and of the terminal crater of *Mauna Loa*, are on a not inferior scale, but their action is less catastrophic. Instead of a succession of mighty outbursts, the torrent of lava forces its way continuously through the mountain side, accompanied, indeed, by earthquakes, but earthquakes that are seldom of a destructive character ; and from its point of emergence the stream of fusion flows more or less rapidly seaward as the slope of land is less or greater. These eruptions and streams of liquid lava sometimes continue incessantly for more than a year ; that of 1855-6 lasted fifteen months, flowing over a course of fifty miles in length, and disgoring an amount of lava nearly equal to the entire bulk of *Vesuvius*.

The character of the lavas is complex ; they are composed of silica and alumina, with oxides and earthy bases. Silica is by far the largest constituent ; next

comes alumina. Two earths are found in these lavas, lime and magnesia; and two alkalies, soda and potash. The lavas fall naturally into two classes, in respect to their composition; in the first, or acid group, there is much silica; the second, or basic group contains more alkalies and earthy bases, and the lavas are very fusible. The lava of Kilauea is so fluid that it sticks like molasses, and even splashes like water. Many hundred square miles of the Island of Hawaii are overspread with recent lavas of this description.

The method of progression of these lava-streams is interesting and peculiar. Breaking out, as they do, at the point of least resistance in the mountain-side, often at a vast elevation above sea-level, the white-hot fusion pours down seaward at first at a tremendous rate of speed, flowing under a solidified crust or vault of partly-cooled lava like a river under ice, and sometimes at the pace of thirty miles an hour. But when the stream reaches the gentler slopes of the mountain, its speed slackens; and finally, as it spreads itself out upon the vast reaches of nearly level ground either between the mountains or toward the sea, its progress is checked, and is no longer continuous, but halting, for the stiff inclosing crust of cooled lava that encases it now opposes a check to its progress.

"The lavas below," says that veteran observer, Titus Coan, "are sealed within a rigid crust that confines them on every side. Their onward progress is thus checked for hours or days. But as the tremendous pressure of the stream behind increases the crust is rent, and the liquid lava bursts out and gushes forward or laterally for a hundred, five hundred, or a

thousand feet or more, as the case may be. The surface of this extended mass cools and stiffens in turn, again confining the living lava. Then, with new pressure from behind, there is a fresh rupture in the confining shell.

. . . Thus overcoming all obstacles, the fusion is kept under cover, and moves forward or laterally in its own ducts for an indefinite distance." (*Life in Hawaii*, N. Y., 1882, p. 333.) It is a process which I have often watched in the uplands of Hawaii. The force is supplied from the mountain fissure, whence the ever-pouring stream of lava produces a growing pressure at every point of resistance; finally the crust breaks with a crash and roar, and a mass of red-hot lava is poured forth and rushes forward for yards or rods or furlongs. This presently forms for itself another enclosing crust, and the progress of the stream is checked again only to burst forth once more in obedience to new pressure. Thus little by little the stream gains mile after mile upon the level ground; thus its terminal point, many miles from the fountain-head, may continue to advance after the fountain has ceased to play, by means of the mere gravity of the fluid lavas in the covered ducts; and the same *vis a tergo* may even force a "belch" of lava upward and over an elevation under these strange dynamic conditions.

Of course any attempt to divert, modify or check the course of the lava streams is entirely futile. I remember that a Chinese merchant in the town of Hilo, on hearing of the approach of a lava stream from Mauna Loa, complained that the natives showed no enterprise in the management of eruptions. "In China," he continued, "we should have had that flow ditched and brought

down to the sea long before now, and sold admissions to see the flow at four cents a head."

When the great eruption of 1881 was within a mile of the seashore, and threatened to destroy the town of Hilo, and seasons of fasting and prayer had proved of no avail, a deputation of pagan worshippers went quietly by night to the foot of the stream, made their sacrifices to the goddess Pele, the divinity of the volcano, and departed. The eruption, which had been flowing for nine months, stopped on the afternoon of the next day.

These great outpourings produce two main varieties of lava, considered as to its outward form. One is called the *pahoehoe*, or satin lava; the other is the *aa*, or clinkers. The first form is produced by the flow of very fluid lava over a nearly level surface, leaving a crust as already described; its surface is shining and vitreous, and it spreads itself, in vast contorted masses, over miles and miles of country, its vesicular surface glittering in the sunlight with all the colors of the prism, while its general hue is gray. The second form, the *aa* or clinker lava, is produced by pressure from behind forcing forward the lava current when it is no longer fluid, but is cooled to a degree of viscosity that checks its motion. The most tremendous strain is thus set up in the substance of the lava, and the result is a degree of shattering, torsion, and fracture, which leaves the cooling stream in a state of frightful brokenness and jaggedness. It is as if the drinking-goblets of a million Titans had been shattered and flung down upon the world in colossal fragments of jagged black glass. Walking is impossible over such a surface as this, or if at all practicable it is only at the expense of ruined

shoes, stumblings, and bleeding hands ; though in course of time a trail even over these savage wastes is gradually formed where the need exists.

I have spoken of these streams of lava as bringing destruction in their path. Of course nothing can resist their progress. Whatever cultivation or handiwork of man is in their way is instantly destroyed. Worse than this, the ancient forests and not these only, but the more permanent features of nature herself are obliterated by these vast and resistless torrents. Though the lava on occasion will climb a hill, as I have said, it naturally prefers the valleys, and from these it not only drives off the rivers in clouds of steam, but it fills the valleys to the level of the land around them, and wherever it moves it leaves a gray and fuming surface in place of profuse fertility.

But these streams of lava are creative as well as destructive ; they bring from the depths of the earth the materials of new fertility. The lavas are rapidly decomposed, at least under a rain-fall. Where the climate is perfectly dry, they may lie for twenty or thirty years and seem as fresh as if outpoured the day before ; but rain acts rapidly upon them. I have seen sweet potatoes growing luxuriantly in crevices of a stream of lava which was still smoking, or rather steaming. Finding a place where the fresh lava is sufficiently cool, the natives pulverize it roughly, add a few handfuls of dead grass for a foothold, and in this plant the sweet potato. Under warmth and moisture it germinates rapidly, and in due time produces an enormous tuber which moulds itself into the crevices of the lava, and attains a delicious flavor. I may mention that more than one hundred

varieties of sweet potato are claimed as indigenous to the group.

The soil is entirely composed of decomposed lavas and vegetable alluvium. It is everywhere rich, and in some places deep and extremely fertile. The chief tropical productions are grown with facility : coffee, bananas, rice, cocoanuts, breadfruits, oranges, sweet potatoes, yams, cotton, and tobacco. But the great product of the country hitherto is sugar. No other country in the world gives such a record of sugar productivity to a given area as Hawaii. A yield of three or four tons to the acre, which in other sugar-producing countries is considered phenomenal, is here no more than the average ; while five, six, or even seven tons to the acre is not uncommon. In Hawaii sugar is king thus far, and is likely to remain so ; but in the case of his dethronement the other tropical products already named will find a profitable development in a favoring soil and climate.

The climate is healthful and extremely equable. There is no word in the Hawaiian language to express the idea of weather. At Honolulu the mean temperature is 75° Fahr., and the daily range seldom over 15°. The extremes of temperature in the shade are 53° and 90°. The excessive heats of our American summers are never known ; and in this respect the islands are favored above any other of all the tropics. Nowhere in the world is there another warm climate of the same equability which is free from excessive heat ; even among other groups of the Pacific these islands are peculiar in this respect.

What is the cause of this climatic fortune ? It has been explained by the Rev. Sereno Bishop, using the

“Challenger” soundings as his data, substantially as follows: In the Atlantic Ocean, the deep cold current from the Arctic and the opposing current from the Antarctic ice flow along the ocean floor until they approach the equator, when they meet, and are thrown up to within 500 fathoms of the surface in a great sheaf or fountain. Thence they return northward and southward upon the surface as heated currents, diffusing tropical temperatures in the course of their flow. In the Pacific a very different course of deep-sea currents exist. Bering’s Strait is a narrow and shallow passage, and cuts off the escape of the Arctic waters southward. There is thus no deep-sea current from the north to meet the corresponding cold current from the Antarctic ice and to throw up its mighty, slowly-moving fountain of waters to be warmed under the equatorial sun. On the contrary, the deep-sea flow of ice-cold water from the Antarctic icebergs moves northward upon the floor of the Pacific for 10,000 miles, nearly from pole to pole, until it reaches the great Alaskan and Asiatic barriers, which throw it to the surface, still a cold current. Thence it returns southward upon the surface as a cool current gradually gaining heat, and reaches the Hawaiian Islands at the tropic of Cancer, warmed to about 70° Fahr., a temperature which it holds throughout the year with great constancy. The islands are thus not only bathed in an ocean of mild and equable warmth, but for thousands of miles the northeast trade winds have swept over the same sea at the same temperature. The sea determines the temperature of the air, and the air has thus the most agreeable of tropical temperatures. Siroccos, tornados such as

those which prevail in Samoa, and the withering heats of our American summer are never known. As a consequence of these unique climatic conditions, the white man easily labors all day long through the warmest season. The farmer can engage in his field work from morning until night without exhaustion; and while there may be some diminution of vigor in this warm climate, still it is the most attractive, comfortable and healthy in the tropical world. Alone among tropical islands, the Hawaiian group presents a desirable climate for the white races. It is true that these Islands do not foster the ardent, unresting activity of the United States and of Europe. But a winter spent in the East tones up the fibres of the American resident, and he returns with new vigor to the duties and pleasures of Hawaiian life.

It may be asked why the Hawaiian Islands do not have the hot and moist climate of islands like Cuba in the North Atlantic and Tahiti in the South Pacific? The answer is implied in what I have already said. Cuba and the West Indies generally are heated by the vast northward set of waters directly from the equator, which bring torrid heats and moisture to these islands. Tahiti and all of the South Sea Islands are warmed by the returning surface currents of the Pacific similarly heated, but flowing southward from the equator. In either case the atmosphere is surcharged with the moisture evaporated by the heated ocean, and we have hot, damp climates, due to hot surface currents flowing from the equatorial region. But in the case of the Hawaiian Islands, as nowhere else, the surface current comes from the polar and not from the equatorial region, and when it reaches that favored group it has acquired the perfect temperature for

human comfort. The Hawaiian seas, in a word, are continually replenished from the cool waters of the north. All other tropical islands are laved in the heated seas that flow from the equator; and even the Micronesian Islands, 3,000 miles west of Hawaii, have no mitigation of the torrid heat. The reason is that there the great equatorial surface current, a heated current, has attained its full breadth and force, and cuts off the cooler surface current from the north.

Thus the Arctic barrier determines a climate of exceptional attractiveness.

What race of people inhabit this earthly paradise?

It is more conveniently described as the brown Polynesian race than by any other name. Distinctly allied with the Malay, and by a still remoter descent claimed to come from our Aryan stock, they form a species that possesses distinct and most interesting traits. Their habitat includes twelve groups of islands extending from Hawaii in the North to New Zealand in the South Pacific, and from the Lagoon Islands in the Central Pacific to Easter Island, a few hundred miles from the coast of Peru. This vast expanse of ocean includes a triangle roughly corresponding in extent to the North American continent; and throughout all this area the brown Polynesian is the only aboriginal inhabitant. He occupies twelve groups of islands: Hawaii, Tokelau or Union Islands, the Lagoon or Ellice Islands, the Phoenix Islands, the Tonga or Friendly Islands, the outlying eastern portions of the Fiji group, New Zealand, Tahiti, the Marquesas, the Harvey or Cook's Islands, Paumotu or the Low Archipelago, and Samoa; and a number of isolated islands in addition like Easter Island,

famous for its pre-historic statues and great stone platforms. Throughout this entire area the race, the language, the manners and customs, the arts and the character are essentially one. I have myself embarked at Honolulu, 1,000 miles to the north of the equator, and going ashore at the Harvey Islands, a thousand miles to the south, have conversed without difficulty in the Hawaiian tongue with the natives of the southern group.

A few words as to the language may be not inappropriate here.

It has about sixteen independent sounds, vowel and consonantal. It had no written literature, but was reduced to writing by the first missionaries, 1820-30, with an alphabet of but twelve letters. The ratio of vowels to consonants in the language as spoken is extraordinarily high. In an Italian sentence the ratio of vowels to consonants is nearly as 2 to 3; in Hawaii the ratio is 3 to 2, or more than twice as great. The result is an extremely musical language. The superabundance of vowels is prevented from cloying the ear by a guttural break that separates two contiguous vowels when one of them is reduplicated, as in the word *a-a* used above.

Sometimes the same vowel is repeated three times in the same word; and it is possible to construct a sentence of half a dozen words or more in which there shall be no consonants whatever, as in the following sentence: "*E i oe ia ia e oo ia,*" "Speak to him now, that he may learn."

Every syllable must end with a vowel,—a phonetic necessity which gives rise to some very peculiar compromises on the part of the native speaker between his language and the English. The name Smith, for in-

stance, in Hawaiian becomes *Kamika*; the language not possessing the sound of *s*, and a vowel of some sort being necessarily interpolated after each consonant. Such a name as *Armstrong* was absolutely unpronounceable. The natives puzzled themselves over it in vain, and finally called it "Lima ikaika," a literal translation of the name.

The Hawaiians, like other brown Polynesians, were great natural orators, full of eloquence and action when their feelings were roused. Like other original peoples, they were full of poetry also, and cultivated several varieties of this art. Their *meles*, or chanted compositions, recorded their history, their geography and their science. Long lines of ancestral rulers or family names were thus preserved, as in the Homeric chants. Their love-poetry was often touching and beautiful, and it contained real sentiment, though it was not always of the most refined. Marriage existed, but its type was not one that civilized peoples would consider very high. Before marriage, perfect liberty was extended to the youth of either sex alike, and what were known as trial marriages were often made, no thought of impropriety attaching to them. If however a child were the result of such a union, marriage usually followed; but marriage among the Polynesians was not the permanent and sacred thing that it is held to be in civilization. These unions were often, indeed perhaps usually, broken after continuing a certain number of months or years, at the option of either party. Children often naturally suffered from neglect, though not nearly so much so as in the countries less favored by nature. It has been estimated that two weeks' labor in the fields was quite

sufficient to support a Polynesian for a year, and under these conditions, of course, the support of children was a much less serious affair than in the cold climates. The pressure upon population was relieved by infanticide. Some years ago I had the pleasure of a correspondence with Charles Darwin upon this subject, and I pointed out that the female children were more frequently sacrificed than the male. (See Darwin's *Descent of Man*, Am. ed., pp. 187, 188, 191.) The newborn children were most frequently the victims; but when their lives were spared for a certain time, the natural dictates of feeling usually triumphed, and the life of the little one was saved. There were, however, instances where infanticide was committed when the child was several years old.

In the main, however, the character of the Hawaiians, as of other brown Polynesians, was extremely amiable. They were affectionate, trusting, and generous to a fault. Hospitality was one of their cardinal virtues; it led, indeed, to an abuse of kindness on the part of many; and a class of indolent persons, known as *hoapili-mea-ai*, "food-friends," was developed; naturally they were looked upon with reprobation. Hospitality was sometimes carried to an extent that was blamable, according to our ideas of ethics. For while the bonds of family were held with jealousy in most cases, yet when a distinguished guest arrived, not only the entertainer's house and food were at his service, but even his wife or daughter sometimes formed a part of the entertainment. This generosity was looked upon with much disfavor by the missionaries. But the usual feeling of the Hawaiian toward a woman who resisted the usage was not of ap-

probation because she was virtuous, but of blame because, as they said, she was "stingy."

With the coming of the new civilization much of this has been changed. The Hawaiians retain their amiable traits, but they have been more or less sophisticated by intercourse with the whites, and they are undergoing rapid extinction and amalgamation with other races. The census now gives a population of about 82,000 in the group, and of these only about 35,000 are pure Polynesian. There are some 20,000 Chinese, nearly all males; 8,000 Portuguese, 5,000 Japanese, 9,000 Americans, English and other Europeans, and several thousand half-breeds. The Chinese are esteemed as good husbands by Hawaiian women, being good providers and reasonably faithful. The half-breeds are a bright and active race.

The government is a limited monarchy, intelligently administered by the native king, Kalakaua.

What is the physical type of the pure Hawaiian?

The men are above the average stature and strength, though under civilization the old chieftains, who were of especially fine physical development, have for the most part disappeared. The Polynesians were the tallest and strongest of races that have anywhere been measured, with one exception—the Tehuelche Patagonians of the eastern coast.

The women are of much smaller stature than the men, but beautifully and voluptuously formed. The chief drawback to their beauty is the flattened nose which belongs to all Polynesian tribes. This is supposed by some to result from the custom of the *honi*, or embrace, which consists of rubbing face to face in-

stead of kissing. Kissing, indeed, the Polynesian considers as a mere waste of time and opportunity.

This amiable race is now in the too rapid tide of transformation ; for it must be said that transformation for the brown Polynesian means destruction. As in all the other Polynesian islands, the aborigines are rapidly passing away under the influence of civilization and Christianity.

What is destroying them ? It is not disease or wars ; it is the result of radically new ways of life, forced upon an amiable and receptive people more rapidly than they can receive it. In a century the Hawaiian has made as much progress from barbarism toward civilization as the Anglo-Saxon made in 2,000 years. But that progress is purchased at the cost of his existence. The single present cause of his extinction has been named by Darwin ; it is sterility from changed conditions of life. Few children are born in a family, and of these a large proportion do not survive to maturity. This infertility is the result of the well-meant but fatal experiment that trade and missions have carried out upon this charming people. "The Anglo-Saxon contagion," as Mr. Matthew Arnold has named it, has been especially fatal among every race which has not opposed it. The Polynesian welcomed the trader and the missionary. First he was decimated by foreign diseases, and then he succumbed to the foreign civilization itself. Where Captain Cook numbered 400,000 aboriginal inhabitants, only 35,000 are now left. Another century, and the last of the pure Polynesians will have disappeared, a prey to the "Anglo-Saxon contagion."

THE PORTUGUESE IN THE TRACK OF COLUMBUS.

BY

DR. P. J. J. VALENTINI.

III.

THE CHART.*

The chart, when unfolded for the first time by a connoisseur of ancient cartography, cannot but fill his mind with wonderment and positive surprise.

Used as he has been to the scanty presentations of the New World in the Cosa-chart and in the Ptolemies of 1508 and 1513, the never-dreamt-of revelation is unrolled before his eyes, that the Portuguese, already in the year 1501, were able to draw a map showing the correct outlines of the Eastern and the Western World (as far as then discovered), and encompassing the two Atlantic valleys, North and South—the whole of it a picture, as if taken from a modern chart. A grand and noble production, indeed! It invited little Portugal's fortunate monarch to embrace, with one single glance, the boundaries of the great kingdom, that he and his forefathers had silently conquered for themselves in the mysterious Atlantic during the short space of about sixty years. Lusitania's blue banner, with its five black balls, is perceived floating on the shores of the Eastern, the Northern, and the new Western Continent. It is planted on the western coast of Africa, as well as on that of

* See last page of the Bulletin.

Greenland, Labrador, and Brazil, and it was not without deep significance that the Cape Verde Island of *Santiago* had been chosen as the central point around which King Emanuel's new world moved.

Nothing was spared by the careful cartographer to illustrate his work. To bring land and water into clear relief, the coasts are colored green, but only on their edges, the ocean itself appearing in the color of the paper. The large islands are all painted green, the smaller ones blue, and the smallest are colored red.

Quite in the taste of the time, the interesting localities of the two continents are marked by emblematic pictures. In the remote east of Asia Minor we see the *torre de babilonja*, and over the Adriatic there is a full picture of St. Mark's Place in Venice, with its two famous columns. Moorish North Africa is in a complete state of siege, blockaded throughout with fascine baskets. On the coast of Guinea the *Fort da Mina* forms the centre of some rather droll representations. Negroes are seen dancing around; an immense golden lion across Sierra Leone is holding in its paws the banner of Portugal, while in front of it some green parrots are carrying on a lively conversation, and at a greater distance a company of white cockatoos are engaged in the same way. Brazil, on the other hand, shows as its natural emblem a flock of gaily-colored arras birds, with a background of tall forest trees. The Corte-Real land in the north is studded with an abundance of slender trees for the masts of future fleets.

The chart is of a rather imposing size; it measures 38' 6" by 41' 6".

The projection is planimetric throughout. The cob-

web lines drawn all over the surface radially converge toward a system of rectangularly distributed centres, each of these being made conspicuous by the effigy of a compass-rose. In this respect the chart must be ranged among the well-known ancient compass charts.* Simultaneously, however, another cartographic feature is met with, this being an intersection of lines drawn across and lengthwise, but not in accordance with our strict system of meridians and parallels. For it will be observed that these cross-lines do not follow one another at distances of measured geographical degrees. Their succession is not marked by numbers, nor was the equatorial line taken as a starting base for their construction. Nevertheless, this delineation, as it stands, was not made without a certain practical purpose. For, upon closer inspection, it will be observed that the perpendiculars are made to pass through the ports and places which, as long nautical experience had shown, lay along the same line from north to south. All these meridians show remarkable correctness as regards the places and ports belonging to the old continents of Europe and Africa, but there are, naturally enough, considerable mistakes in those drawn through the New Continent.†

* On the subject of mediæval compass-charts and navigation consult: *Sophus Ruge*, Ueber Compass und Compasskarten, *Dresden*, 1868.—*A. Breusing*, Zur Geschichte der Geographie; in *Zeitschrift für Erdkunde*, *Berlin*, 1869, *Bana IV.*, Seite 31–51 and 97–115.—*A. Breusing*, Zur Geschichte der Kartographie, in *Zeitschrift der wissenschaftlichen Geographie*, *Lahr*, 1881, *Heft 4 und 5*, Seite 129–133 and 180–195.—*Theobald Fischer*, Ueber ital. Seekarten und Kartographen des Mittelalters, in *Zeitschrift für Erdkunde*, *Berlin*, 1882, *Band 17*, Seite 20, sqq.—*Eugen Gelcich*, Beiträge zur Geschichte des Zeitalters der Entdeckungen, in *Z. f. Erdkunde*, *Berlin*, 1885, *Band 20*, pag. 280–325.—*Ernst Mayer*, Hilfsmittel der Schiffahrtskunde z. Zeit der gr. Länderentdeckungen; in *Mittheilungen aus dem Gebiete des Seewesens*, 1879, *No. IV.*

† To quote instances: the meridian of Tarragona intersects in the north

This remark, however, cannot be fairly applied to that meridian which in the shape of a broad, blue printed stripe, traverses the chart, and bears the inscription: *Este he o marco dantre castella e portuguell*. "This is the boundary line between Castile and Portugal." In the north it crosses Corte Real's New Foundland, which was discovered in 1464, and re-visited by the son of the former explorer in 1500. In the south the line is seen striking the eastern shores of a large gulf that bears the name *golfo fremosso* (the roaring gulf), while the Castilian banner, planted on the left side of the line, denotes that at this point the limits of the two hostile dominions were supposed to meet. For it was at this place that Vic. Yañez Pinzon, on his return from a southern cruise as far as Cape San Roque, was able to effect a landing on the 2d of February, 1500.*

There is, indeed, no spot to be found on our whole planet better fitted to suit the purpose of a final territorial demarcation. No doubt this *golfo fremosso* on our chart is the mouth of the great *Pará river*, while the neighboring gulf, the *Rio grande*, with the additional

Dutch Breda and Bruges (here written Bruyas), in the south African Tunis (tunes)—a mistake of about $1^{\circ} 33'$. The meridian of Salonichi passes African Tolometa, with the mistake of $1^{\circ} 89'$. The Cape Verde Islands are in about 15° north latitude; their parallel passes through the mushroom-shaped peninsula of Parana-gua—mistake about 3° . The meridian of Santo Domingo intersects the same peninsula, and the chart shows it passing through the cabo desseado (mouths of the Orinoco and Trinidad Island), an error, therefore, of more than 8° ; and so on.

* *In Navarrete*, Col. d. V. Tom. II., Nos. 17 and 18, page 23-35. *Ant. de Herrera*, Dec. 7., Lib. 5, cap. 6, in which the interesting statement is given that Pinzon on this expedition started from the Cape Verde Islands, evidently with the purpose of solving the problem of the *raya*, and authorized to make an anchorage on the Portuguese island, by the Capitulation de Tordesillas. *Paesi nuovamente ritrovati*, Milan, 1508, Cap. 112. *Petrus Martyr*, ital. Ed. of 1512 and 19, Cap. CXIII.

inscription : *todo este mar he de agua doce* (this whole sea is of fresh water) stands for the river *Marañon*. Both waters form the mouth of the mighty *Amazon*, the largest river of the whole world, which here empties itself into the ocean to breast another demarcation line of our globe, that of the equator.*

The news that Pinzon had found land still farther east than that reached by Columbus at the Gulf of Paria, and that he had taken formal possession of it, reached the two monarchs on the 30th of September, 1500. At last the opportunity presented itself to settle the vexed question existing between them how to find the dividing line and where to draw it. It must be here remembered that, according to the Pope's Bull, the line was to be found one hundred leagues west of the Azores and the Cape Verde Islands. But the ambassadors of King Joam, when treating with King Ferdinand in Barcelona, had succeeded in inducing him to allow the line to be drawn two hundred and seventy leagues farther to the west, which established it at the distance of three hundred and seventy leagues from the Cape Verde Islands, the treaty being ratified by Castile on the 5th of September, 1494, and by Portugal on the 27th of February, 1495. By this treaty of Tordesillas both kings pledged themselves to equip a joint expedition for this purpose.* But the expedition, so far as we know,

* Read for full information as to the exact spot of Pinzon's landing : *H. H. Smith, Brazil, the Amasons and the Coast*, New York, 1879, Scribner ; *Fr. Silva, l'Oyapoc et l'Amazon*, Tom. II., § 25-30, 25me lecture, pag. 407. On the roaring of the pororoca-wave, read : *Adalbert, Prinz von Preussen, Aus meinem Tagebuche*, S. 508, Berlin, Decker, 1847.

† *In Navarrete*, Col. de viajes, Tom. II., pag. 136 : Capitulacion de la particion del mar Oceano, hecha entre los Católicos Reyes Don Fernando y Doña

never started. Disputes arose about the difference between a degree—on the equator—and one in the latitude of the Cape Verde Islands, as well as about the value of a league and that of a degree. Jaime Ferrer,† King Ferdinand's astronomer, allows us to have a glimpse at the confusion that reigned in the minds of navigators. He writes that there are no means of making the pilots understand the astronomical side of the question; that it would be best to let ten pilots sail from the Cape Verde Islands due west, to have them register the distance sailed from six hours to six hours, and after the distance of three hundred and seventy leagues had been run, to take the average. It is beyond doubt that independent efforts must have been made by both nations to settle the matter during the five years from 1495 to 1500. But as in a due west direction there was neither island nor continent on which to plant a banner and establish a permanent and visible boundary short of the distance of six hundred and fifty leagues, at the Leeward Islands of Martinique and la Dominica, no palpable result was reached. Neverthe-

Isabel y Don Juan, Rey de Portugal; "que se haga y asigne por el dicho mar Océano una rraya o línea derecha de Polo a Polo, ques de Norte a Sur, la qual rraya o línea e señal se haya de dar e dé derecha, como dicho es, à 370 leguas de la Ysla de Cabo Verde para la parte del Poniente, por grados o por otra manera, como mexor e mas presto se pueda dar."

* *Navarrete*, Tom. II., pag. 99. *A. Breusing*, l. c., discusses with great clearness the methods and instruments used by the ancient mariners in calculating the distance sailed: 1, by estimating the force of the wind, *Gissung* (Engl. guessing); 2, by measuring, at any alteration of the course, the angle formed by the tow-line and the keel and by employing the *tavola de martelojo*, *Strichtafel*, first introduced in the Portuguese marine by Jacopo de Minorca, at the Academy of Sagres, 1432, which *tavola* gave the mariner a practical direction how to couple the two courses of the ship, the direct and the altered one; the further professional instruments being the Amalfitan compass and the hour-glass.

less the positive impression remained on the minds of the Castilian and the Portuguese navigators that land was to be found somewhere at the distance of three hundred and seventy leagues west of the African shores. Columbus on his second and third voyages carried instructions from the King to attend with the utmost diligence to the business of the "raya divisoria." But he did not find time for doing so, his main attention being directed to his colonial affairs in Hispaniola. Pinzon, his rival, watchful to bring himself into prominence, had now succeeded in giving a certain practical turn to the problem. His discovery, indeed, though not due west, was still to the west of the Cape Verde Islands, at a distance which he must have had means for computing as approximative to the stipulated three hundred and seventy leagues, and which, on the other hand, the Portuguese hydrographers must have been ready to accept as at all events the best suitable divisory meridian. For it happened that only ten weeks later than Pinzon (April 21) Cabral had struck Cape San Roque, had taken solemn possession of it in the name of the Crown of Portugal, and had sent a fast cruiser with the important news to Lisbon. His dispatches reached the Court long before Pinzon's return to Palos, and it was but natural King Emanuel should claim that his new possession reached as far to the northwest as Castile had planted her banner, which was at the *cabo desseado* and the Pearl Islands of Columbus's latest discovery. This view, however, must have been abandoned on the arrival of Pinzon, whose claim for an additional tract of land down to the mouth of the Amazon River was prior in date to that supported by the landing of Cabral.

No clear documentary evidence is left as to the discussions that at this stage of the great boundary question were taking place between the two kings. We only know that they personally were on the most friendly terms with each other. Besides, it is a known fact that the meridian of the mouth of the Amazon has, up to this day, remained the dividing line between Brazil and French Guiana. All the controversies that arose between the two bordering nations were only with regard to the actual spot on which Pinzon made his landing. We may still say it was in the spirit of a true and equitable compromise that the two monarchs agreed upon drawing the line at the place mentioned. It runs just midway between *Cabo Deseado* and *Cabo San Roque*.*

Was the draughtsman, on the day he traced the chart, informed as to the number of *leguas* that he was to enter on the chart between the Cape Verde Island and the stipulated *marco*? Did he count only 370 *leguas*, or did he make the number accord with the distance as given by the log-book of Vic. Yañez Pinzon? or finally did he pay no attention to the matter, but work out the composition of his oceanic *tableau* as he thought best?

The last view cannot be entertained for a moment, since the chart is provided with a scale graduated in accurate spaces, and, therefore, evidently destined to serve as a key for the distances on the map. We find this scale delineated at the right below, and at the left above the chart, but neither in figures nor in words is the value

* Pinzon gave to this cape the name of *Cabo de Consolacion*; Cabral called it *Cabo S. Agostin*, and our map shows the name *San Yorge* (a misnomer for *San Roque*?); but this entry evidently was made by a hand different from that of the draughtsman.

of the spaces expressed, such being the bad habit of the ancient cartographers. Were it not for a passage preserved in the contemporary Peter Martyr,* in which the learned councillor of King Ferdinand enters upon a discussion on the merits of La Cosa's chart, we should be without the authentic knowledge that the hydrographer's scale was arranged in spaces, each of these representing 12 *leguas*. On our chart the distance from the island of Santiago to the *marco* measures 35 spaces, and the length is, therefore, 420 *leguas*.

If Peter Martyr's statement is to be rejected as applicable, not to the Portuguese, but to the Spanish scale, the value to be assigned to the spaces on the Portuguese chart may be ascertained by trying the scale on well-known distances in the Mediterranean sea. We find the distance from *Cape Ceuta* to the west cape of Sicily to be 320 *leguas*, and that from Reggio (*Rezo*) to Cerigo (Satrill) 136 *leguas*; added together, these make 456 *leguas*, and give a continuous line, which is equal in length to one measured from the Island of Santiago to the Amazon meridian.

This line extends through 35 spaces of the chart. Each space, therefore, represents about 13 *leguas*, and this rough calculation agrees pretty closely with the figures given by Peter Martyr. It does not appear whether the King of Castile was conscious of having lost 86 *leguas* in longitude east by this agreement. In reality he lost much more; for the true distance comes near to 560 *leguas*. Had Castile firmly insisted upon her origi-

* *Petrus Martyr*, De rebus Oceanicis, Decada V, Cap. 7.—F. A. de Varnhagen, Examen de quelques points de l'hist. géogr. du Brésil, in Bulletin d. l. Soc. de Geogr. 4^{me} Serie, Tome XV, Mars, Paris, 1858.

nal claim of 370 *leguas*, the Portuguese dominion in North America would have been reduced to the small strip of land lying to the eastward of the meridian of Rio de Janeiro.

IV.

THE STELLÆ MARIS.

Let us now pass from this hasty survey of its general features to those which especially belong to *our* chart, and which are not found on any contemporary Spanish chart.

In this direction we note the representation of three naval stations. The one will be found at the Island of *Santiago* (Cape Verde), the second at the island of *Andros* (Bahama Archipelago), and the third on the mushroom-shaped Peninsula of *Paranagua* (Coast of Venezuela). The first is located east of the *raya*, in the Portuguese waters; the two others are in Spanish waters, west of the *raya*.

For the better understanding of what we mean by naval stations, let us say that this chart, as well as all the large marine charts of the epoch, shows on its surface, so to speak, a well devised system of inter-radiation, the radii starting from and crossing through a certain number of central points distributed all over the chart. From each of these central points 32 lines are seen radiating in the direction of the 32 points of the mariner's compass. The central points are represented in two different ways. One kind shows the centre figures arrayed in a perfect square, each of the four corners bearing the effigy of a carefully delineated and colored

compass-rose, also called *stella maris*. These had their location assigned by the hand of the cartographer to arbitrary positions, which served his planimetric purposes, and thus we see these *stellæ maris* on ground and waters never visited nor measured by travellers and mariners. The other centre figures, on the contrary, represented places really existing in nature, and these are conspicuous on the charts by the absence of the compass-rose. They designated the port from which the pilot used to start, the official naval station of his country. If this were explained nowhere else, we might learn it from La Cosa's chart. He drew a plain *stella maris*, without the effigy, near *Palos*, Castile's official seaport, and, another one, of the same kind, near the island *Habacoa*, the *Abaco* of to-day, a place well chosen to serve as a naval outpost against ships attempting to slip into the Spanish waters through the Bahama Channel, the shortest route from Lisbon or Madeira. Palos and Habacoa are connected by a line drawn through both centres, thereby showing that the latter island was reached by the "Greco-Levante," or E. N. E. wind. A third *stella* of the same kind, for which, however, we cannot find any historic interpretation, is represented on the west coast of Africa, south of the Bissago island.* These three are the only plain *stellæ maris* to be found on the Spanish chart. All the others stand in square, and bear the effigy as described.

* Both charts show at this place a group of small islands, unnamed, which must be recognized, being the St. Ann Reefs and Sherboro islands of to-day. The Spanish nomenclature along the western coast of Africa, it will be noticed, is widely different from that of the Portuguese, a proof that although forbidden to enter these waters, the Spaniards were as unscrupulous in the non-observance of the treaty of Tordesillas as the Portuguese.

On our chart the *stella maris* of the official naval station is not met with at Lisbon nor at Madeira, as might be expected. The cartographer with great artistic as well as with patriotic tact gave it a far more becoming place, at the Cape Verde Island of Santiago, right in the middle of the great marine picture, and in the centre of the ocean that his king and nation had begun to rule. In any direction from this point, wherever one radius of the compass strikes a coast, it touches land discovered and conquered by Lusitania's courageous pilots.

It was but a short time before that the little island of Santiago had claimed the attention of Portugal, and that it had been found to be a most suitable maritime depot and station for her navy, so eager for distant oceanic explorations. It had been discovered in 1446 by Cada-mosto and Anton de Nolle, two cavaliers, to whom Henry the Navigator had granted the permission of making explorations along the coast of Africa. When the Canary Islands had to be surrendered to ambitious Castile, the half-forgotten group of the Cape Verde Islands became the welcome rendezvous of the Portuguese. On their voyages along the scorching shores of Africa, the mariners here found the inestimable advantage of repose, with the opportunity for repairing damages and recruiting their strength. Wherever in the scanty records of that epoch mention is made of the early Portuguese expeditions to the Indies, we read of the admiral's making an anchorage at Santiago.* Its selec-

* See J. de Barros, *Decada 1^{ma} da Asia*, Lib. 4^o, Cap. 2^o. Lisboa, 1628. "Bartholomeu Dias. . . com bom *têpo* *tenerão* em treze dias *forão* ter d *Ilha de Santiago* que he a principal das do Cabo Verde, onde tomarão algum refresco." The

tion as the starting point from which to find the dividing *raya* in the West made it a much sought for centre of daring seamanship as well as of hydrographic speculation.

Considering all the facts and reasons by which our cartographer was prompted to bring the island of Santiago into the graphic relief of a naval station of his country, it is not without a certain degree of surprise that two more such stations are found drawn on the chart in the far west of the Spanish waters, a domain which the Portuguese were peremptorily forbidden to enter. No doubt, an interdiction like this must have been disregarded not only once, but many times and by both parties. No surveillance was possible on the immense expanse of these waters. Both parties knew this very well, and greed as well as mutual hatred ran the risk of capture. There is no record of Spanish prizes brought in by Portuguese, although the latter had a good chance for this if they ever got any knowledge of the Spanish station at the St. Ann-Reefs and the Sherboro Island. But we do read of a very formal complaint lodged with the Crown of Castile in the year 1503, which proves that inroads were made by Portuguese ships into the Caribbean sea, and gives us full insight into the true nature of these un-

same. Dec. 1, *Lib.* 5°, Cap. 2 (A. 1499) "Pedralvarez com toda a frota fazendo sua viagem às ilhas do Cabo Verde." See also *Hieron. Osorius*, de Rebus Emanuelis Regis gestis, Olyssipone, MDLXXI., pag. 31. "Hoc eodem anno (1499) V° Idus Julii, Emanuel primum nuncium de rebus Indicis auspicio suo exploratis accepit. Quemadmodum gestum sit, est ab initio repetendum. Gama, ubi primum solvit Olyssipone, cursum ad Fortunatas insulas direxit, deinde insulam, quam appellant *Sancti Jacobi*, quae respicit Aethiopiam, lustravit Pag. 55. "Inde Gama ad insulam *Sancti Jacobi* ventis secundis apulit." Pag. 64. "Interim vero Capralis (Cabral), qui in Indiam navigabat, eundem cursum quem Gama, secutus est, donec ad Insulam Scti Jacobi pervenit."

bidden visits.* Rodrigo de Bastidas, the discoverer of the gulf of Darien, who on these shores had some trading interests at stake, writes to the king that Portuguese vessels had made their appearance in these waters, that the crew had cut Brazil-wood on the coast, had plundered the natives and made away with a large cargo of slaves. Therefore, it was not the problem of the dividing meridian alone that lured these vessels into the distant waters, but the lucre resulting from the sale of the precious dye-woods and the human flesh, in the market of Lisbon, a trade besides, to which the Portuguese had been used for long years, and which they now tried to extend, because they could do this without much risk, and at the cost of the national enemy. All these circumstances concur to furnish an explanation why the cartographer felt prompted to draw the Santiago-Paranagua parallel, and to stamp the latter place with the character of a Portuguese sailing-port or naval station. Paranagua, then, belonged to the Bastidas-coast, and it is not without a certain significance that we find drawn on the chart at no great distance an island named Brazil.

North of this same place and at the head of the great Bahama Bank another naval station, the third on the chart, is found.

* See *Ramon de la Sagra*, Hist. phys. de Cuba, Vol. II, pag. 448, Apendice, where the renowned historiographer of the Faithful Island brings the following abstract, taken from the Registro de los titulos y de las nominaciones para los empleos de la casa de Contratacion de Sevilla, 1503-1579: "Le 13 Juillet, 1503, un courrier fut expédié à la cour pour donner avis de ce que l'on savait au sujet des bâtimens portugais, qui ont été à la terre de Bastidas, et en avaient enlevé des esclaves Indiens, et du bois de Brésil. Le 22 Août, 1503: Juan de la Cosa fut envoyé pour avoir des renseignemens sur ce que les Portugais avaient fait avec quatre navires, et sur un autre qu'ils avaient *convenus* envoyer cette année. Et Cosa donne à la Reine à Ségovie deux cartes marines des Indes."



It is worth while examining at what particular spot in the Bahama Islands this station was made. It excites our utmost curiosity. We see it placed, audaciously enough, in the very heart of King Ferdinand's newly acquired *insular* dominion, north of the large island of Sabella, and facing a large tract of coast to the west, covered with unknown names, and presenting an outline that corresponds with nothing in that direction. It is the picture of the same coast that appeared in the first editions of the Ptolemy, the one that Ruysch's Ptolemy of 1508 indicated as the last western point touched by King Ferdinand's vessels, a coast however, strange to note, that had remained entirely unknown to Castile's great cartographer La Cosa. Up to the finding of the Cantino chart the identification of this coast has been a puzzle. We believe that clear light may now be had on the subject, and must beseech the reader patiently to follow a comparison between the three maps of the Antillas, that of La Cosa, that of Cantino and the modern map, for which purpose we furnish the adjoining diagrams, 1, 2, 3. The interesting result will be reached thereby, that King Joam II. was far better informed about the distant west than King Ferdinand himself, that the shape and the proportions of the great Antillas are more correctly represented, and the groups of the Bahama Islands more distinctly discriminated by the Portuguese hydrographers; all this implying on their part much cautious and silent labor, and a long sojourn, as indicated by the entry of the *stella maris* in the Bahama Channels.

Let us begin with a comparison between La Cosa's and a modern map of la Española or Haiti. La Cosa

gives Haiti's axis nearly the length of that of Cuba, while it is in reality not quite half as long. The Cantino chart shows the proportions much better taken : Cuba = 1 and Haiti = $\frac{2}{3}$. On Cantino's outline of Haiti we miss the great western bay with its island of *Gonave*, as also the capes of *Tiburón* and *San Nicolas*, which are pretty well rendered by La Cosa. Such important features would surely not have escaped the Portuguese pilots and hydrographers if they had only dared to show their sails so near the thickly populated Spanish island. Nevertheless, the Portuguese knew of the existence of this bay. We find it drawn on Cantino's map on the north coast with the island of Gonave, whilst on the other hand *Tortuga island*, which is quite forgotten by La Cosa, stands in Cantino in its correct place. All these little points tend to show that the Portuguese hydrographers were in a sense independent of the Spanish surveys. Where the former had no chance to make their own survey, their representation grows defective, where they had free scope they surpass the Spaniards.

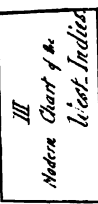
This point will be still more clearly shown when we pass to an examination of Cuba. It will be noticed, at the first glance, that the relative positions of the three islands, Cuba, Haiti and Jamaica, are so correctly represented on our chart that they almost appear to have been taken from a modern survey. La Cosa makes the mistake of pushing the western cape of Haiti far below the eastern end of Cuba, while the two points, in reality, lie due north and south, as they are placed on the Portuguese chart.

One of the most striking proofs, however, that the Portuguese had sound information as to the true dimen-

sions and shape of Cuba will be found by taking a glance at its western end. La Cosa gives to this end of the island the form of a hook bent to the south. Although our modern maps do not show these curving lines, La Cosa's design is still not so unfaithful to nature as it has been judged to be. He undoubtedly imagined the Island of Pines was a continuation of the mainland of Cuba, to which belief he was induced on account of the numberless large and small coral islands that obstruct the channel. The Portuguese chart also shows the same hook-shaped western end, but in addition to it a large peninsular body, which the copyist of the chart, for reasons later to be explained, chose to draw bending towards the north instead of the west, the true direction. It follows that this whole western tract of Cuba, from Havana to Cape San Antonio, which to-day is known to many of our readers by the name of *Vuelta de Abajo*, was still in the year 1500 unknown to its legitimate owners, but known and accurately surveyed by their spying rivals. Whatever mischief these intended to perpetrate, whatever information they wished to gather as to the extent and nature of King Ferdinand's Indian domain in the far west, they were able to work with full knowledge. Cuba, at this epoch, was still a desert. Only its southern coast, as we may learn from La Cosa's chart, had been surveyed, and its harbors and capes provided with names. The whole northwest, accessible from the *Stella maris* by deep waters, lay open at the mercy of the pirate.

But on which of the many Bahama Islands are we to look for their hiding-place?

The answer to this question can only be found after



a comparative examination of our three maps. Let us begin with counting on the two ancient maps the islands represented north of Cuba. La Cosa's chart counts 19 islands, of which 10 are provided with names; Cantino exhibits 18, with 11 names, and only five of these names agree in both, those of *habacoa*, *someto*, *haity*, *mariguanana*, and *lucayo*, which goes far to show that the Portuguese did not depend entirely on the charts drawn by the Spaniards. We also notice that the former chart exhibits a marked endeavor to bring the grouping of the islands into greater prominence than the chart drawn by La Cosa, and it is just this conspicuous grouping which will make it easier for us to ascertain the identity of the individual islands.

To begin with the uppermost, that of *habacoa*, there is no doubt it stands for the many little insular bodies of which the island of Abaco on the modern chart is composed. Position as well as name confirm the fact.

South-east of Abaco, and separated from it by a broad channel, that of Providence of to-day, we cannot fail to recognize in the three islands east of the meridian of the *stella maris* the thrice-divided Andros group of our modern surveys, in which the island of Espiritu Santo suggests the identification with the *ilha Santa* of our chart.

North-east of this Andros group, and separated by a channel, which probably was intended to represent the large inlet now called the "Tongue of the Ocean," we find another group of three islands, inscribed with the name *Someta*. These suggest to us the islands of Providence, San Salvador, and Eleuthera of our modern maps.

South of these, the large island surrounded by reefs, which bears the name of *haty*, seems to represent the modern Cat Island, the great Exuma, and the girdle of reefs that embosoms what is to-day called the Exuma Sound.

Watling, Rum Cay and Yuma Island may be recognized in what the Portuguese called *ilha managua* (to-day, Mariguana), and *macabiza* and *bauestico* would represent the Atkin Islands. The Crooked-passage between them and the former is distinctly marked.

Undoubtedly the two next unnamed islands were meant to represent the modern Caicos group with its additional southern bank, Turks passage on the right being left open.

Then follows Turks-island, named *Janucanata*, Mouchoir carré or *ilha de lucayo*, Silver bank or *Caycemen*, and in the *baixos de abre los olhos* we are justified in recognizing the perilous reefs of *la Navidad*.

As to the great Bahama Bank, it is pretty correctly represented in La Cosa's as well as in our chart, inasmuch as in both its southern edge is made parallel with the north coast of Cuba.

In both ancient charts, finally, we meet with a *stella maris* north of the island of Cuba. There will be noticed however a palpable difference in regard to their location. La Cosa puts his *stella maris* far to the west of the Bahama Bank and Abaco, at the entrance of the Florida channel, whilst in our chart the location of the *stella maris* is to the east of the Bahama Bank and in the vicinity of what we have recognized as the Andros island, the two stations being separated therefore by a distance

of about 160 miles. The position of the Spaniard in this channel, as already mentioned, was well chosen. It must have been destined to protect this entrance against the much dreaded inroads of foreign vessels, because it could not be supposed that they would choose their passage through the much frequented southern channels of the little Leeward Islands, since these had become the customary lines of Spanish traffic between Palos and the harbors of La Española. It is only surprising that with this channel station so near the coast of Florida, that peninsula was not discovered before the year 1514.

On the other hand, this Portuguese station near Andros Island suggests some interesting reflections. The whole Bahama archipelago might be vainly searched to find a hiding-place better adapted to piratic enterprise than the one Andros offers. It stands at the front of the other large oceanic channel, that of Providence, thus affording a wide outlook to the open sea. At its back is a basin of deep water, the so-called "Tongue of the Ocean," girdled by a circular string of countless banks and islets, through the channels of which the expert may seek entrance or slip out on any emergency. Andros, moreover, is the only place in the Bahamas that has a creek of fresh water to supply a fleet with this necessary of life and keep it anchored during all seasons. History informs us how long and how successfully this very place served as an unapproachable resort and unconquerable bulwark to the pirates of all nations. Not until 1718 did the British and their Captain Wood Rogers succeed in making an end to the mischief by taking possession of Providence Island and building Fort Nassau. Inci-

dentally it may also be remarked here that Christopher Columbus, on his first voyage, if he had persevered in his initial strictly western course, would have sailed right into the mouth of the Providence channel. But it happened that when upon the 7th of October, 1492, no land had been descried by his impatient crew, Columbus had been forced to yield to the entreaties of Alonso Pinzon, and to change his course to the south-west, so as to lose himself in the labyrinthine reefs and banks encompassing Exuma and Long Island. Therefore, if King Joam and his courtiers listened, as we have every reason to believe they did, with the utmost attention to Columbus's narrative, and especially noted his forced change of course toward the south, because this new course implied a violation of the ancient demarcation line, and if furthermore, as we know, the king secretly dispatched the four caravels to discover the track of Columbus, it almost seems as if, cautioned by his sad experiences and dangers run in the labyrinth of the Long Island and Exuma shoals, the caravels had steadily kept his original western course and thus by entering the Providence channel, had seen Andros heaving out her broad shoulders in the blue horizon. What better could they do than rest at such a place, their first landfall after crossing the wide ocean ! Columbus's boasted secret was now in their possession. They must have been pretty busy later on in trying to identify the other islands, to which Columbus had given the names of Concepcion, Juana, Fernandina and so on. They must have remembered the name of a certain fort *Isabella*, which he had built on the southern shore of the large island of *haty*, where he had left his brother Bartholomew with a small garrison. Now,

south-west of Andros the Portuguese had reached, as was pointed out above, a large island, that of Cuba. It was the only island that they could meet with after leaving Andros for a farther western cruise. Very likely they took it for Columbus's *haty*, and in their first bewilderment they put it on their sailing chart with the name of *Ysabella*.

Islands are but monitors of a not distant continent. The old Portuguese salts knew this from their Mediterranean and African experiences. If they were now bent upon paying a visit to Columbus's Indies, they had no other choice than to keep their prow turned toward the west. Onward they sailed. The western end of Cuba, the Cape of San Antonio, came in sight. Survey and information taken on the spot proved that it was part of an island; but they were in search of a continent. The natives must have repeated to them the story that had been told to Columbus, but which he had disregarded—that “with one day's gentle breeze a continent could be reached, inhabited by people wearing clothes down to knee and ankle, and many of them as pompously attired as the chaplain of the foreign vessel when he was reading mass.” *

* We find Columbus oftentimes reproached for not having pushed farther to the west on his first and second voyages to the island of Cuba, and for having delayed in this way the discovery of the shores of Central America. The reproach is unjust. On both occasions his ships were in a most dilapidated condition, his provisions at an end, and the crew were unwilling to risk their lives in any farther adventurous expedition. See *Historie del Sig. Don Fernando Colombo*, Milano, 1614, Cap. LVII., pag. 232. “Et a' 7. di Luglio dismontó (Colombo) ad udir Messa in terra, dove gli si accostó un Cacique vecchio, Signor di quella Provincia, it quale stette molto attento alla Messa . . . et 'fra le altre cose disse, che egli era stato nell' Isola Spagnuola, et vi conosceva de' principali huomini: si como anco in Giamaica: et che era andato molto verse l'*Occidente di Cuba*, et che il Cacique di quella parte vestiva come Sacerdote.” Expressed in other words but of very like

The coast they found in this direction is drawn in our chart, like a barrier stretching from south to north. It is inscribed with twenty-one names, most of them only such as sailors use to give, but all of them in the Portuguese language.

There is no coast of this configuration directly opposite to the Cuban cape of San Antonio. What section of the American continent this coast was intended to represent in the maps of the Ptolemies and of Schoener, as well as in this recently discovered Cantino map, is a question that has so far remained without an answer.

Let us approach this subject by first examining the names.

V.

THE NAMES INSCRIBED ON THE COAST.

Upon approaching the discussion of this subject, it will be convenient to the reader to have before his eyes the three pictures of this portion of the New World, published in Europe, in the successive years of 1508, 1513 and 1520. They are represented in the diagrams Nos. 2, 3 and 4, No. 1 giving Cantino's chart. The reading of the names, as they are inscribed on this chart will first occupy us.

They were written unquestionably by the hand that drew the whole chart. This happy circumstance enables us to determine by means of comparison the identity of

tenor are the reports given of the same subject by *Andres Bernaldes*, the Cura d. l. Palacios, who gathered them from Columbus's own lips. See the translation of his *Historia d. l. Reyes Católicos* in Collection of the Massachusetts Historical Society. Vol. VIII., 3d Series, pages 6-68.

any letter, in case of doubt as to the interpretation of its alphabetic value.

The letters are written in the cursive Gothic alphabet, commonly employed, at this epoch, by all the calligraphers of southern Europe. They are the work of an experienced and steady hand, and are cut so clearly as to give the impression of being printed rather than drawn with the pen.

The names inscribed upon the coasts of the two old continents follow each other in such close succession that the draughtsman, for the relief of the reader's eye, occasionally changes from a black to red lettering. On the New Continent the names of Portuguese Brazil are all written in red, those of the Spanish portion, the discoveries of Columbus and Bastidas in black, the Antillas again in red, and the names of the coast unknown to us all in black. All of them without exception are inscribed upon the land; a very judicious arrangement, because the eye of the reader, in this way, gets a clear impression of the outlines of the coast.

The idiom employed is the Portuguese, though here and there, and mainly with the articles, Spanish and Italian forms appear to be intermixed.

Beginning our examination with the south of the unknown coast, we meet with the names:

1. *Rio de las palmas*.—The reading of it, as well as the translation, "river of the palms" (Palm river) gives no matter for discussion.

2. *Rio do corno*.—The letter *n* in *corno* is so clearly expressed, as not to admit any change into a conjectural *u* or a *v*. The translation, therefore, will be: *Horn river*, a river that, like many others, showed

an alluvial horn or curve at its *debouchure* into the ocean.

3. *C.: arlear.*—The abbreviation of Cabo, or cape, as made with three points, is typical on this chart. It will be observed at other similar places. The word *arlear*, in the mariner's language of that time, signifies to strike sails, the correct form for it being in the Portuguese language *arrear*.

4. *C.: do lurcor.*—Must be read *lurcar*, and in better form *lucrar*, the use of the metatheses of this kind being very common in Spanish and Portuguese vulgar speech. *Lucrar* means to gain, to make a lucre. It corresponds to the Spanish *rescatar*, to barter on foreign coasts. Hence, *the cape of barter*.

5. *C.: do mortinbo.*—By the simple change of the letter *b* into an *h*, the word would give a sense, and might be translated by *Cape of myrtle-seed*.

The *myrtaceae*, however, do not grow on tropical coasts; they only thrive at an elevation of about 6000 feet above the sea. We, therefore, think the word must be read *Martinho*, a proper name appearing in various forms, as: *Martin*, *Martim*, *Martimho*. A port of Portugal opposite the Berlengas Islands bears the name: *concha de San Martinho*, and on other maps *Mortinho*. Thus we translate: *Martin's-cape*.

6. *Cabo.: lurcar.*—This time the letter *a* is clearly expressed, and the repeated occurrence of the name will not surprise, when we consider that the chief interest of the trading mariner was to note the places at which he had the opportunity of bartering with the natives.

7. *El golfo baxo.*—To be translated: *the deep gulf*, a name very appropriate for this deep twin gulf, by the

side of which it stands written. The left cross-stroke of the *x* does not appear in full continuation, its end showing distinctly beneath the preceding letter *a*. Compare No. 12, where a like break of the left cross-stroke of the letter *x* is found in a word, for which there is no other reading than *roixa*, *red*.

8. *C. do fim de abril*.—The dot over the *i* in *abrill* is not quite clearly marked, and the word might be read *abrell*, which, however, conveys no meaning at all, and *abrill* must stand, so that the name signifies: *Cape of the end of April*. This nomenclature would suggest the idea that the cape was made at the end of the month of April. We know of but a single instance in which the name of a month was given to a place discovered by the Portuguese, that of the Brazilian bay of *Janeiro* (January). Whenever a proper name was given by them or by the Spanish mariners, it was that of a person, and, in particular, that of a saint of the calendar. Nevertheless, admitting the precedent of *Janeiro*, we may suppose that this cape was reached on the 30th of April. *Beda's Martyrologia Romana*, Vol. V., page 334, shows that this day is that of SS. Marianus et Jacobus, a nomenclature which possibly may have been rejected on account of its length; and for a like reason others, such as *Cabo do ultimo de Abril*, or *Cabo do trinta de Abril*. On the assumption that King Joam's caravels left Madeira by the middle of the month of March, 1493, it is not at all improbable that they struck this cape on the last of April, after a navigation of six weeks.

9. *Cornejo*.—It is positively impossible to decide whether the name reads *Coruejo* or *Cornejo*. The very strange shape of the penultimate letter invites to com-

parison with others of the kind. We find it occurring again in *Jenoves* and *San Jorge*, and therefore must write it *Cornejo* and pronounce like French *Cornejo*. Italians and Spaniards also would incline to write this name *Cornello* and sound it like *Cornellio*. Just as the word stands, it does not admit of any translation. Undoubtedly it is a native name and presents one of those perplexing cases of misspelling on the part of the copyist, who himself may have been at a loss how to read this name from the original map or from his intermediate copy. Ruysch, Ptol. 1508, reads *Corveo*, the Ptolemy of 1513, *Contello*, and Schoener, 1520, *Coniello*. The discussion of this name will be taken up again in the next chapter.

10. *Rio de dô diego*.—Written out in full—*Rio de don or dom Diego, Diego river*.

11. *C. delgado*.—To be translated: *Narrow Cape*.

12. *Pûta rotxa*.—Transl. : *Red Point*.

13. *Rio de las almadias* signifies: *Canoe river*. The word *almadia* is of Moorish origin, meaning a boat hewn out of one single trunk, in contra-distinction to the timber-made boats of the Portuguese and Spaniards.

14.—*Cabo Santo* is the *Holy Cape*.

15. *Rio de los lagartos* or the *Alligator river*.

16. *Las cabras*.—As the words stand, they ought to be translated: *the Goats*. Such a name, just at this place, seems to be inadmissible. The letter *c* is rather to be viewed as a common national aspirate, and the reading should be therefore *abras* instead of *cabras*. This reading was proposed by Mr. Harris, and affords full satisfaction. For just at this place (as will be shown

further on) the coast presents a succession of inlets or channels opened by the impetus of the surf, and for these the Spaniards used to employ the word *bocas* or *mouths*.

17. *Lago luncor* or the *Luncor* (?) *lagune*. This does not admit of any plausible interpretation.

18. *Costa alta* or the *High-coast*.

19. *Cabo de boa ventura* or *cape of Good Luck, Lucky Cape*.

20. *Canpice*—The *p*, as it stands on the chart, at first sight looks like an *f*; and the reading would then be *canfuce*. Upon closer examination, however, the apparent *f* will be found to represent a *p*, as this letter is elsewhere written on the chart. If it were meant for an *f*, it ought to show the long flag-dash, which it has not. No interpretation can be found for this word *canpice*. Probably it is of native origin. Ruysch, as will be seen, leaves it out entirely. The Ptolemy of 1513 writes very indistinctly: *Caninar*, and Schoener 1520, *caninor*. The explanation suggests itself that the copyist himself was embarrassed in reading his original text. The word did not fall within the compass of his linguistic experience.

21. *Cabo d. licôtu*.—The abbreviation does not admit of other and better completion, than that of *Cabo del incontro*, which means the Cape of Encounter, or combat. Ruysch has *C. Elicontii*. The Ptolemy of 1513 *C. delicontre* and Schoener, 1520, *Cabo dellicontis*.

22. *Costa del mar Vacano*.—Correctly recognized, but rendered in bad orthography, this inscription will be found in the Ptolemy of 1513 with *C. del mar usiano*, or the *Cape of the Ocean Sea*.

At this place the picture of the coast comes to an end, and by this last inscription our hydrographers evidently did not intend to express anything more than that their exploration and survey were stopped here on account of the coast and the ocean extending before their eyes to an immeasurable distance.

From this attempt at a correct reading of the names, we now pass on to examine whether these names may be made to disclose the identity of the places upon which they were bestowed by the Portuguese cartographer.

(To be continued.)

THE GREAT BASIN.

BY

WM. H. BREWER.

“The Great Basin” is the name popularly applied to a region of the Western United States lying between the Sierra Nevada and the Wahsatch Mountains. It has no one single character which does not belong to some other portion of the globe, yet it constitutes the most distinctive geographical feature of the North American continent. It is an area of interior drainage, that is, none of its streams flow to the sea. Such areas are found in the other continents, but this one has a combination of features which belongs to it alone. Even if this was not the case, from its position within our own country and because of its actual character, it has for us an especial geographical interest.

There is a large and rapidly growing literature relating to this region, but the most of it relates either to special features or else is a narrative of travel. I know of no recent and general description of the basin as a whole, therefore in this lecture I purpose to bring together items of common information and to consider it as a geographical feature of our country, rather than to give you the results of recent original exploration. My own work in the basin was done long before any part of its present railroads was built and was confined to the Western edge.

Moreover, the more important observations I then made have been published elsewhere in connection with the various scientific objects for which those explorations were made. I have only seen the other portions of it as the passing traveller sees it since railroads have penetrated that country.

But let me here say, the traveller of to-day who goes whirling across it by express train in luxuriously equipped palace cars, well supplied with all the comforts and luxuries of travel, and has abundant to eat and to drink, when trains reach their destination on time and distant friends can be communicated with by telegraph, and when the whole breadth can be compassed in a day or two ; such a traveller, I say, can know little of the toils, the discomforts, the hardships and the positive sufferings with which earlier travellers crossed it ; nor can he appreciate or even imagine the sufferings incident to the earlier explorations. The tragedies of those days seem to us as the creations of romance, and the tales of adventures and experiences seem as improbable as the story of the Arabian Nights.

Each of the continents has regions of interior drainage. Those in Asia and Africa are larger than ours, and there are various smaller ones, but the chief among them (unless it be the Sahara) so lie in the interior of the land that the waters flow from their borders outward to two or more oceans. Ours lies entirely in one continental slope ; that is, it is entirely surrounded by land which is drained to the Pacific.

These areas of interior drainage on the various continents vary greatly in their details of character, and have, in fact, but the one feature in common, that none

of their waters flow to the sea. The term "Basin," which appears to have been first applied by Captain Bonneville to ours, has come to be used as a general term for them all, and is the descriptive term used in some text books in Physical Geography.

This use of the word is on the whole unfortunate in that it suggests a great error as to the actual character of such regions, and also suggests an erroneous cause for their existence. I find many people, otherwise intelligent, who have the idea, more or less vague, that the causes lie in the structure of the country, that there is a veritable basin or sunken area with a rim of mountains about it so high that the waters cannot get over the edge and flow outward to the great sea; that it is the rim which causes the basin and turns the waters inland to sink in the sand or evaporate from salt lakes in the enclosed and sunken interior.

This misconception has been intensified by the fact that most travellers who cross it, find on one side the Rocky and the Wahsatch Mountains, and on the other, the still grander and higher Sierra Nevada. To such travellers the region seems obviously a basin with high mountains on either side which seem barrier enough to hold back the water, and a sufficient cause to prevent the rivers from ever reaching either the Atlantic or Pacific.

The real fact is, that it is not a basin of which the rim is an essential feature. The cause is climatic and not structural. It is in the air above it, and not in the rocks beneath it; it is the climate and not the geology or topography that makes the "Great Basin."

Pardon this elementary talk, but it must be kept in

mind for an appreciation of the actual features of this remarkable region. It is a dry region, and it is the dry climate that makes the basin and not the basin that makes the dryness.

Whether a region of country is drained to the sea or not depends entirely upon the relative rain fall and evaporation, not at all upon its geographical structure nor how high a rim of mountains there may be around it, nor how deep its valleys may be. If more rain (or snow) falls on an area than evaporates from its surface, then the surplus water runs off in streams. If these streams run into a hollow with a rim, a lake will form in the lowest place, and the lake will increase in size until the evaporation from its surface will just balance the streams that run into it. Such is the case with the Great Salt Lake and the Caspian Sea. If more rain falls than can evaporate, then, give it time enough, the hollow will fill up and overflow, no matter how great the area, how high the rim, or how deep the depression. Most of the lakes of the earth are of this kind, from the mere pond to Lake Superior and the great lakes of tropical Africa. All such lakes have streams flowing into them fed by the rains and an outlet of fresh water running out. This must be so, whether the bed of the lake is below the sea level as is that of Lago Maggiore, and many of our own lakes, or whether as high as Lake Titicaca or the lakes on the borders of China.

Such fresh water lakes may lie within areas of interior drainage, their outlets running into the still lower lakes which are salt. Some such lakes are high above the sea, as are Tahoe in our own basin, and Titicaca in South America ; others are low as is Lake Genessareth in Pal-



estine, which is 850 feet below the level of the ocean, its overflow being into the still deeper depression of the Dead Sea.

The size of the salt lake in such a depression depends entirely upon the relations between the size of the streams which feed it and the evaporation from its surface. Should the streams increase for a series of years, the lake will rise and the surface increase. If the rains diminish then the lake also diminishes in area. The size of the lake does not depend on the size of the basin, nor on its height above the sea, nor on the height of its rim. The rim about the basin containing such lakes may be four miles high, as with some of the lakes on the Pamir or it may be merely low sand hills but a few feet high, as is a portion of the rim of the Colorado Desert.

The lakes from which the last evaporation takes place in all these regions of interior drainage are salt, but they vary greatly in their saltiness ; the one possible exception is Lake Tchad in the Soudan.

The salt in these lakes is usually not the pure salt used in our households, but a mixture of various compounds known to chemists under the general name of salts.

There are now in this American basin depressions in every stage of lake and dryness ; fresh water lakes like Tahoe, of deep, cold, very clear, fresh water ; others like Pyramid Lake, brackish, but not salt enough to kill fresh water fish ; others salt to saturation. Some are *playas* with water only after the rains of winter, drying up in summer to plains of glistening mud. In other valleys are expanses of shallow salt or alkaline water lasting throughout some years, but which sometimes dry up leaving only sheets of salt and alkali in the depres-

sions. Still other valleys have great beds of salt, showing where lakes have entirely dried away, the beds of salt being their fossilized remains.

After this long introduction in elementary physical geography let us notice more particularly the features of the American Great Basin.

It lies between the Wahsatch Mountains on the east and the Sierra Nevada on the west, and extends about 12° of latitude, or from about latitude 44° in Oregon to about latitude 32° in Lower California.

I have plotted on the United States land office map the outlines and area of the Basin for our use here; by carefully following the line of divide around the whole area and then shading the region the better to show it. Its extreme length according to this map is about 900 miles, and the extreme breadth at right angles to the line of greatest length is about 520 miles.

Estimated from this map its total area is about 217,850 square miles. Mr. Russell, of the United States Geological Survey, in his monograph on Lake Lahontan, estimates the area at 208,500 square miles.

The States and Territories of this part of our country are of such great size that we, inhabitants of the smaller States, find it hard to appreciate this enormous area; but to do this we have only to mark a corresponding area (in shape and size) over the Eastern United States. If its northern portion be placed in Canada near Lake Huron and its eastern portion at the Hudson River and the Connecticut line, its southern point will be in Georgia and its western line extend through Tennessee, Kentucky, Indiana and Michigan. The whole area is nearly five times as large as the State of Ohio.

This great region is traversed by numerous mountain chains having a general north and south direction with valleys or plains between them. These mountain chains vary greatly in their geological structure, in their topography and in the aspects of their scenery. Some are so isolated that we can travel entirely around them, and others have some topographical connection with some other chain. They are of all heights, from the mere hill to peaks above 12,000 feet, and of various extent from the isolated butte to chains of several hundred miles in length.

The valleys between them have even greater variety of character. Some are fertile, others unmitigated deserts. Some are really high plateaus, as is that of the Great Salt Lake ; others are below the level of the sea, for in this Basin are found the lowest portions of the surface of the American continent.

The whole area is not one basin in the sense of one drainage area, one water-shed as engineers would say, but consists of many. All parts of the region are dry, most of the rain falls on the mountains and runs off into salt lakes or into the *playas* or "sinks." I know not how many drainage basins are combined to make this whole area, but there is certainly a score or more.

Bear in mind that if there was rain enough, all these lower places would fill with water until it ran over their respective rims. The drainage from the mountains would run down their slopes as now. A great number of lakes would be formed in the various valleys and their outlets would find their way to the Pacific by various routes. Some would empty northward to the Snake and Columbia Rivers, thence to the ocean ; some

find their way westward through the Sierra Nevada by way of the Klamath Valley ; some southward into the Colorado River or the Gulf of California ; and possibly still others across Southern California to the ocean.

But, over the whole region the actual rain-fall is vastly less than can be evaporated from the surface and this scantiness of rain-fall is the all-controlling factor as to its agricultural resources and its fitness for the homes of men.

The economic foundation of civilization is agriculture, and for agriculture there must be rain in considerable quantities, at least in occasional years. Crops may be grown for a time by irrigation in a rainless region, but they cannot be so grown for an indefinite period. The same causes which make lakes salt or alkaline if there be no outlet ultimately make soils also salt or alkaline, and this causes barrenness.

Streams always contain a small proportion of certain salts which have been washed out from the soils from which the waters come. Where these run into closed lakes, and the water is evaporated from the surface, the salt is left behind, thus making the lake salt. The character of the salt depends upon the chemical character of the soil of the water-shed. In the same way where the water of rivers or streams is used for irrigation, if all the water is evaporated from the cultivated soil, injurious salts are left behind which accumulate and finally destroy the fertility of the land and turn it back again into a desert. For irrigation to be permanently successful, there must be some rain, and in occasional years a sufficient water to wash out and carry the deleterious salts away.

Every where in the Eastern United States, more rain falls upon the land than can evaporate from it. In New England, New York and the region east of the Mississippi, one year with another, from 40 to 70 per cent. of the rainfall flows away to the sea, and the soils of such localities may be perpetually fertile.

West of the Mississippi a smaller proportion flows to the sea ; but over all the region east of the 100th meridian some of the rainfall of every year flows from the land ; there are but few places in the United States outside of the Great Basin, where some of the rainfall of occasional years does not flow away. Over large portions of the Great Basin, the rainfall is so slight that there is neither water for irrigation nor the conditions for permanent fertility, even if waters could be found. There are, however, many isolated districts that are fertile and may be irrigated.

The mineral wealth of the region, however, is vast ; it is indeed wonderful both in variety and in richness ; but mineral wealth alone and of the kinds most common in the Great Basin has never yet made a permanently prosperous State.

The truly prosperous State must be a country of homes, and this occurs only where agriculture can be practiced on a considerable proportion of the land. On a relatively large proportion of the American basin agriculture is not possible. It can never support at best more than a relatively small agricultural population, although there are scattered spots of great fertility and some of marvellous beauty.

This region was not always so dry. In the geological age just preceding the present one, there was a period

during which our Northern hemisphere was much colder and the climate much wetter than now. It was called the Glacial period, and ice covered much of the Northern hemisphere. Geologists tell us that it covered all New England and New York, the Southern edge of the great glacier reaching down into Pennsylvania and Southern Ohio in the Eastern United States. Then there were also stupendous glaciers in the Western mountains. They have left their traces everywhere. Glaciers sometimes a mile thick and several miles wide filled the valleys of the Sierra Nevada, and extended down into the Basin, their great moraines at the mouths of the numerous cañons still testifying of their great extent and volume. Incident to this period, both before and after it, there was abundant water in the Great Basin.

Lakes then existed there, some of great size, and from the nature of the country they must have been of marvelous beauty. Geologists have especially interested themselves in the study of the history of two of these lakes, one in the western part known as Lake Lahontan, another farther east called Lake Bonneville. The great Salt Lake is what is left of the latter; the former is dried away to a few shallow salt lakes or to dry deserts. This western Lake Lahontan has been made the subject of a special monograph by Mr. Russell, of the United States Geological Survey. According to this authority its area was at least 8,400 square miles, (or a little larger than the area of the State of Massachusetts). We find if we look at a copy of its map that the lake was more irregular in shape than any large lake at present known upon the globe, its outlines deeply indented by numerous mountain chains extending far into it, and irregular

islands, one of large size, dotted its surface. Although a fresh water lake, it is thought to have had no outlet ; that it began to dry away and disappear before the depression was entirely filled to overflowing. With a change in climate it has dried away ; about a half a dozen lakes more or less salt occupying some of the lower depressions, other parts of its bed being occupied by "*playas*" or alkaline "sinks," which are unmitigated deserts.

The chief of these lakes are Walker's Lake, South and North Carson Lakes, Pyramid Lake, Winnemucca Lake, Honey Lake, and Eagle Lake ; and the two most notable deserts are the Black Rock desert in the North and the Carson desert in the South.

There are several fresh water lakes within the watershed of this ancient lake, the most important and noteworthy of which is Lake Tahoe. This lake, so justly celebrated for its beauty, lies at the eastern base of the Sierra Nevada at an elevation of about 6,000 feet. It is more than 1,500 feet deep, its cold waters are of great clearness, and the Sierra rising boldly from its western shore to peaks of 10,000 feet makes it one of the most picturesque lakes of the continent. Its outlet, the Truckee River, runs chiefly into Pyramid Lake and Winnemucca Lake.

With the change of climate, Lake Lahontan slowly disappeared by drying up ; its successive shores constitute a conspicuous feature of the landscape, and, as already stated, all that is left are the few salt and brackish lakes and beds of salt and alkali scattered here and there in the lower depressions.

During the existence of this lake the region was subject to volcanic eruptions and probably to changes in

level incident to such disturbances. Volcanic activity then existed in many parts of the region within and beyond its actual borders, and numerous mineral springs yielded the various products found in volcanic countries. The chemistry of the drying up of this lake is therefore as interesting as is its geology. There is a curious variety of salts found; here a swamp, in which are buried inexhaustible quantities of crystals of borax; there, plains covered with alkaline efflorescence like snow; again, there are lakes of carbonate of soda; Mono Lake, just beyond the old lake, is a nearly saturated solution of salt, soda, borax and other chemicals. When camped on its shores we found its waters as efficacious in washing our woollens as the best soap-suds, and the barbers of Esmeralda used it for shampooing.

Many springs made deposits of tufa, and some of the tufa masses are of extraordinary, not to say, grotesque shapes, of which illustrations may be found in photographs.

Mono Lake is thought by Mr. Russell to lie outside of this old lake basin, but at the time of my earlier visit I believed it to have been included.

During the existence of Lake Lahontan, extensive beds of sediment were laid down upon its bottom, which beds have been again furrowed by the erosion of the modern rivers which now flow over what was then the lake bottom, and have cut into the strata of the old lake bed.

This sediment is in part such as is generally washed from mountains and in part the volcanic ashes and dust which was rained upon this region from the neighboring craters and sank as an impalpable powder in its

waters. Mr. Russell gives a wood-cut in which volcanic dust from various other sources and from these ancient sediments is brought together and compared. The resemblance between this old Lahontan dust and that from Norway in 1875 and Krakatoa in 1883 is very obvious.

Of the various volcanoes of this region or its borders, the cones and extinct craters of Lake Mono are perhaps the most remarkable. The views of them in published works are from the photographs of Mr. King; I climbed them in 1863; their steep sides are largely of loose sand and pumice, and in the material there is much variety both as to color and texture; obsidian or volcanic glass is also very abundant and of many colors. What interested me more than any other feature of these cones was the finding of a few fragments of granite, roasted and altered by volcanic heat within these craters; they had not been left there by the glaciers, and I am not aware of similar productions having been found elsewhere. They must have been cast up in the later stages of the eruption, but precisely how they could have been thus torn loose from their original position and left as we found them is indeed difficult to understand.

The scenery of this immediate region is sufficiently striking. The steep volcanic cones with a few scattered and stunted cedars and nut-pines, the unmitigated desert at their base with the ever present sage brush and grease wood; Mono Lake itself, 6,000 feet above the sea, its heavy waters strangely placid and smooth; the great Sierra beyond, like a wall against the sky; the Mt. Dana group rising precipitously from the lake to above 13,000 feet and streaked with snows above; the great

moraines stretching out from the mouths of the cañons upon the desert at the base, constitute altogether a picture so unlike anything we have elsewhere in the United States, so unlike anything and everything we have east of the Mississippi River, that it leaves an impression on the mind of even greater desolation and barrenness than actually is the case.

The average rain-fall of the basin as a whole has been variously estimated, but no one places it higher than twelve or fifteen inches annually. In the plains and valleys the average is vastly less ; sometimes several years passing without practically any rain-fall in some of the valleys and it is probable that in some places the average is less than an inch per year. But so far as I know there is no portion absolutely rainless. The rains, however, are very uncertain, and some regions are subject to occasional severe local showers known as "cloud-bursts." These are simply extremely local, heavy showers in which several inches of rain may fall in a limited region, and within a few minutes. The waters gather in the ravines down which they rush many feet deep, with resistless force bearing on their surface the various light objects picked up in their impetuous course, and sometimes excavating gullies many feet in depth within a short time. The stream ceases almost as suddenly as it came. Many such have been recorded, some of which have been very fatal to persons travelling in the region in which they occur.

The dryness of the air, the cloudless sky, the capricious winds, the local whirlwinds which carry up dust, all conspire to give a peculiar beauty and wonderful variety to the atmospheric aspects of the scenery.

Sometimes, particularly in winter, the atmosphere is of marvellous clearness and transparency, objects a hundred or more miles away being clearly and sharply discernible from the peaks within the basin or about its borders. But through the most of the summer season a haze, composed of fine dust, fills the air so that it is much less transparent.

Many of you may remember the remarkable sunsets and "sky-glow" of the autumn of 1883, which were believed to have been produced by fine volcanic dust in the upper regions of the atmosphere brought from the distant eruptions of Krakatoa.

What was then believed to have taken place on a world-wide scale, so far as its effect on the colors of the sky and in producing various optical phenomena relating to the atmosphere was concerned, certainly does take place on a smaller scale, but in a greater variety in the atmosphere over the Great Basin. There is a charming variety of colors induced by the fine dust particles in the air, either by polarization, by diffraction, or other decompositions of the light. There are sunset glows of various colors and there are mid-day glows. We have skies of blue and we have green skies, and purple and pink and various shades of yellow, and so on through many colors and effects, which were it possible to portray on canvas, we would pronounce to be wholly unnatural, however beautiful.

When in the mountains along the western rim and looking out over the deserts and beyond the successive mountain chains to the east of us, this play of colors and varying aspects of the sky was of never failing interest.

And now a few words as to the native vegetation of this region. Popularly, deserts are supposed to be without vegetation. Practically, if there is absolutely no rain nor water, there can be, of course, no vegetation ; but if a region have some rain, even though it may be at long intervals, there will be plants of some kind.

The species of the Great Basin are largely shrubby and adapted to the dryness and heat they are liable to be subjected to. The species of our climate are of kinds that cannot stand protracted drought ; they die when dried, but desert plants retain with great tenacity a sufficient amount of moisture to preserve their life, although they may suspend their vegetative functions for a very long period. Let me illustrate. You are all familiar with the lichens of our climate, growing on the rocks, fence-rails, etc., which in rainy weather are flexible, filled with water, and grow ; in a drought they dry so completely that they are brittle and may be pulverized to a powder in the hand, but yet they are not dead ; no more dead than a seed ; they only require water to again sprout and grow, and when rains come they imbibe moisture again, become flexible, their sap circulates and they grow and increase in size until the next drought comes to again dry them out and suspend their growth. They rest during the drought as other plants do during the cold winter. Their functions are merely dormant, they are not dead. So these desert plants cease their growth during the long and excessive droughts to which they are subjected. These species (for there are many kinds), have usually small leaves, the wood is usually hard and brittle ; they grow when there chances to be sufficient moisture and when the

severe droughts come on them suspend their growth as our trees do in winter, and await better times.

I was in one valley between two high mountain ranges ; the valley itself 4,000 feet above the level of the sea, where there had been less than three-quarters of an inch of rain during the previous eighteen months, and where we found the heat in July from 100 to 110 in the coolest places we could find, and yet this desert was not bare ; clumps of shrubs grew every few rods, sage brush on the slopes, grease wood where the soil was alkaline, and various other species. Some of these were so dry that they would readily burn when a match was applied ; we could not call them "green" but surely they were not dead. The creosote bush grows in the more southern deserts, vile-smelling, with sticky, stinking leaves, so repulsive that it is said even the camels will not touch it. In justice to the camel I should say that this fact has been denied. One of the men who had charge of the camels introduced by Jefferson Davis, and tested on these deserts, told me that the camels did eat sparingly of even the creosote brush.

How long some of these shrubs can survive without rain, I have no idea, but one herbaceous plant, the *Lewisia Rediviva*, found on some of the drier peaks northward, after having been dried as completely as I could do it for herbarium specimens, continued to sprout and grow in the papers in my herbarium in New Haven, for several years afterwards. A botanical journal, some years ago, made a report of plants that had blossomed after the exceptional rains which fell on a portion of the desert of Atacama in South America, after fifteen rainless years. I know of no such tests regarding our own

desert plants, but I have no doubt whatever in my own mind but that there are a number of species to be found within our own Basin, that would live through several rainless years.

There are regions, however, that are practically without vegetation; and several of these are pictured in the Government reports of explorations. Some are alkaline "sinks," others drifting sand, still others areas kept barren by hot springs.

Among these are sand-hills taken from a photograph near the 40th parallel where they stretch for many miles; but drifting sands occur in many other places, sometimes polishing and carving rocks over which they blow. This is especially true on the Mojave and Colorado Deserts where this phenomenon, first noticed by Prof. Blake, has since been noted by many observers.

But in considering this barrenness and desolation, we must remember that there are many spots of great beauty and fertility. These are always near streams at the base of mountains. Even in the barren Owens Valley there are fertile spots, and the unmitigated desert is easily changed into a garden by irrigation, where water of the proper quality and quantity can be obtained. Those who have seen the Carson Valley, with its prosperous farms and green fields and background of high Sierra, must recall it as a beautiful picture.

The mountain scenery is of even greater variety than that found in the valleys; as already stated, the Basin is traversed by numerous mountain chains; and these have every variety of geological structure and every character of rock. Some are volcanic and there is a great variety of volcanic products; here, soft stratified tufas,

there, great lava flows, and again cones of ashes and cinders. There are mountains of trap and basalt, sometimes as columnar as that of the Giant's Causway.

Owing to the peculiar climatic conditions, the erosions and denudations of these mountains are peculiar. The ridges are sharp, the cañons V shaped. As they are rarely clothed with forests and often practically bare of trees, the whole of their elaborate sculpture is plainly discernible. They rise naked from the barren deserts, every ridge of their skeleton evident. In winter these views are even more striking than in summer. I have in mind a view after a recent snow, too light to cover the plain, but heavy enough on the mountains to completely whiten them. The naked, barren chain seemed as white as if carved in the whitest marble, its every ridge coldly clean, scarcely specked with tree or bush, its every ravine distinct, its serrated crest white and sharply cut against the blue wintry sky, the whole rising from the brown, desolate, sage-plain, presenting an aspect as unlike that of forest covered mountains, as if it belonged to another planet.

There are also mountains of soft strata ; mountains of hard, metamorphic rock, twisted and broken ; we have them of great variety of aspect, but, as a whole, they lack the rounded outlines, the covering of forest and the green of eastern mountains. We can hardly call them *Alpine*, because Alp strictly means an upland pasture. The green pastures which are such a characteristic feature of the mountains of Central Europe that they give their name to the mountains themselves are here entirely absent. In fact, one sees little green ; it is said that in the whole State of Nevada, embracing over 100,000

square miles, that "there is only one spot where for more than six square miles together, the landscape is naturally green."

In the southwestern portion of the Great Basin are two or three remarkable depressions. One known as Death Valley lies near the eastern borders of California, only about 70 miles southeasterly from Mt. Whitney, the highest land in the United States. This valley is the sink of the Amargosa River, and was formerly believed to be the lowest on the American continent. Its precise depth below the sea-level has not been very accurately determined, the later statements making it 225 feet, although other accounts make it much deeper.

It gets its dreadful name because of the emigrants who have perished there. It is near one of the old trails which led into Southern California; and emigrants have been decoyed into it hoping to find water, and there perished.

A portion of the Colorado Desert, often called the San Bernardino Desert, the sink of the San Felipe is also a great depression below the level of the sea, probably deeper even than Death Valley. The portion below the level of the sea is said to be about 130 miles long by 30 wide, and the lower parts 360 feet below sea level. These figures are given from popular statements rather than official surveys. It, too, was the bed of a lake as no very distant period, and the old shore lines are strikingly distinct against the sides of the surrounding mountains. Some interesting views of this feature may be found in the old Pacific Railroad Reports. The present Southern Pacific Railroad traverses this depression for many miles.

Portions of the eastern rim of this part of the Basin are merely low sand-hills separating the depression from the Colorado River and the Gulf of California. There have been various projects for flooding this region at the expense of the United States Government, and creating an interior lake which might fertilize a portion of the desert and modify the climate of Arizona. I have no faith in the practicability of the scheme.

Before leaving the western portions of the Basin, let me add a few more words regarding the variety of salts found in solution in the lakes or crystallized in the depressions. The country being more or less volcanic, we have the natural source for a great variety of products. The famous Soda Lakes near Ragtown in Churchill Co., Nevada occupy ancient craters; they are solutions of carbonate of soda and for many years have been worked for this material, producing some hundreds of tons annually. It is estimated that this lake contains nearly a million of tons of the carbonate of soda and sulphate of soda. Carbonate of soda is also obtained from various other lakes of the basin and borax from several places. Salt is also obtained in numerous localities; in some by evaporating the waters, and in other places rock salt of great purity is quarried from extensive beds.

Various other chemicals are found of great interest to chemists and mineralogists but of less economic importance. In the remains of some of these old lakes, gigantic crystals of a peculiar mineral called Thinolite are found which belongs exclusively to this region.

Nor must the numerous hot springs of the region be forgotten: I can attempt no enumeration of their num-

ber. Among the more famous are the Steamboat Springs near Virginia City. Here steam and hot water escape from cracks several miles in extent, and the silica and other mineral matter dissolved in the hot water, when deposited and cooled at the surface, have formed great mounds several hundred feet high and several miles in extent.

As these mineralized waters flow over the surface, they incrust or "petrify" various objects found there; even such frail organisms as crickets and flies are incased in silica, which is gelatinous at first but which ultimately hardens. Some of the hot springs have a reputation for medicinal qualities, and doubtless there are many which would be a fortune to the owner if located in some convenient locality east of the Mississippi River.

I have spent so much time considering the western portion of the Great Basin and the ancient Lake Lahontan, that I have less space left to me than I could wish for the consideration of that other and larger ancient lake, Lake Bonneville. This lake washed the western base of the Wahsatch Mountains, and it was as irregular in shape as Lake Lahontan. Its shores were indented with numerous promontories, and many bold and picturesque islands rose from its surface. It had an area of about 19,750 square miles or was nearly twice as large as Lake Erie. Bear River, the Weber, Provo, and Sevier Rivers, and other large streams from the Wahsatch flowed into it from the east.

This lake had an outlet northward through the present Red Rock Pass at the north end of the Cache Valley in Idaho, and thence to the Pacific by way of the Snake and Columbia Rivers. It has dried away, and the Great

Salt Lake is all that is left of it. It did not disappear regularly, but by successive stages and the terraces left, which mark its ancient shores, are the most striking features that meet the eye of the traveller about Salt Lake, and far to the southward in Utah.

Some portions of this old lake bed now constitute tolerably fertile valleys, watered by fresh rivers, but other portions are totally barren. The great plain lying to the west and southwest of Salt Lake is probably the most unmitigated desert of equal size to be found within the limits of the United States.

The present area of the Great Salt Lake is between three and four thousand square miles, but its size is fluctuating. It has risen and covers several hundred square miles more of surface than it did at the time of its first survey by Lieutenant Stansbury in 1849.

When the Pacific Railroad was finished twenty years later, or in 1869, the lake was said to cover 400 square miles more than it did at the first survey. Some increase has taken place since, and it is known that the surface of Salt Lake is higher and the waters deeper than forty years ago. The early Mormon settlers could ford the lake to Antelope Island; it is utterly impossible to do so at the present time.

This increase of water is not due to settlement and cultivation, but is doubtless due to some secular change in the rainfall on the mountains. The cultivation is mostly in the valleys, while the rainfall is mostly in the mountains. There are very many views illustrating the terraced shores of this old lake, but the effect on the observer of the actual facts is vastly more impressive than any views can be.

The great changes in climate which have produced the wonderful results described as occurring in our American basin are probably simultaneous with similar changes going on over much of the Northern hemisphere. The ruins of towns south of this region, the old Pueblos show that the drying up has extended in our own continent far beyond the present boundaries of the Great Basin, and similar changes have apparently gone on simultaneously with this in the Old World. The Caspian Sea lies below the present level of the ocean, and in its vicinity the drying up has been going on even in historic times. We have historic evidences of great populations where now is desert, and farther east in the same area of interior drainage there are evidences of great dried up lakes.

Lake Bonneville had an outlet. Of this there is no question, and we may believe that the overflow was very considerable. As stated earlier in this paper, the United States Geological Survey thinks that Lake Lahontan had no outlet, and explains how the lake in drying up may have been freshened after the deposit of some of its salts by evaporation. I must confess that I strongly suspect that more complete exploration and investigation will ultimately show that it, too, had an outlet. It would surely be a wonderful thing if the period of rains and of successive dryness should have been so evenly balanced that the depression should run so nearly full and yet never overflow. I do not pretend to say where this outlet was, nevertheless I believe it to have existed. Moreover, my own and less complete observations made about Lake Mono many years ago led me then to believe that Lake Mono had, at some period, a

much higher level than has since been attributed to it ; and, if I was not mistaken in my observations then, the area of Lake Lahontan may have been considerably larger even than that now attributed to it. .

In considering the resources of the Basin as a whole, I do not wish to be misunderstood. The aggregate resources must be very considerable, the most striking portion of which will remain in its mineral productions ; its great mineral wealth has brought to it its chief economical reputation. Its mines have yielded such quantities of precious metals that the finances of the world have been changed, and its production of silver led to the demonetization of that metal. The great Comstock Lode has been the locality of the greatest mines of modern times, and has led to more romantic and famous changes of fortune than the mines of any other part of the world during the same time.

It is unnecessary to compare its many mines with those of Mexico and Peru, but it is safe to say that they have had more to do with the finances of the world during the last twenty-five years than any others on the globe.

Regarding the agricultural possibilities, I repeat, it must ever remain a region of relatively sparse population. The portion in Utah has more popular interest in this regard because of its settlement by the Mormons. The geographical features of the region have been eminently adapted to the growth of such a religious system. It has been a law of the development of independent communities that they needed isolation for their early development, and also natural protection in their isolation. Persecuted and despoiled in the older and more

densely populated eastern States, the Mormons fled to a place of safety. "To build up Zion in the wilderness," they journeyed across the plains, passed through the mountains and settled here, far beyond the borders of civilization. Taking possession of the places better suited for their use, living in village communities, by irrigation they reclaimed portions of the arid soil, and made the desert indeed blossom as the rose.

It was especially suited to their conditions, that is, it had the physical characters and political situation to recommend it to a peculiar and persecuted people. When they emigrated, this region was believed to be beyond the jurisdiction of the United States, and practically beyond the interference of Mexico; political isolation seemed, therefore, secured, and the mountains and the deserts about it were a protection against marauding outlaws and outside people seeking conquest. The land could be reclaimed and made extremely fertile by peoples living in communities, as did the Mormons. It was not adapted to settlement by the gradual pushing of the frontier line, as was the case in the more fertile western States. I need not follow up this wonderful story (which for personal reasons has always had a fascinating interest to me) further than to say that we find in the physical condition of the country one of the reasons for the success of this most wonderful religious movement and most astonishing delusion of modern times.

When I contemplated writing a paper on this subject I intended to have had much more to say regarding the early history and explorations in the basin, and the development of our knowledge regarding it. Many items of information picked up more than a quarter of a century

ago from the actors in the scenes and from individuals now passed away, might make an interesting chapter of more or less disconnected fragments of this early history ; but a recent examination of the literature relating to our western country has shown me that many of the items of history which I believed only existed in tradition, or in the memory of the older explorers, have found their way into print into one form or another and hence need not be repeated for record here.

This Basin, while still containing many nooks and corners to be mapped and explored, is nevertheless the best known by far of the areas of internal drainage in any of the continents. Of the two greater ones, the Sahara in Africa and the still larger one in Central Asia, we still have but very imperfect geographical knowledge. Ours was the first to know a railroad, the Union and Central Pacific roads being finished across it in 1869, and portions of it are now crossed entirely by several railways. Branches from these penetrate to the interior by various routes and there are now within it many hundreds of miles of railway ; I have made no attempt to estimate how many, but persons can now travel with ease and luxury where scarcely a generation ago only the most hardy could survive the hardships of travel, and towns have grown up where then were deserts.

In conclusion I will repeat that the Great Basin must ever remain a region of relatively sparse population, because of its scanty rain-fall.

In any region far from the sea the capacity for supporting a population depends upon the rain-fall or the possibilities for irrigation, and in this area there are

many localities of great beauty and fertility that can be irrigated, but all are relatively small when compared with the total area. In these limited districts there will be ultimately many beautiful places that will be noted for their picturesqueness, for their salubrious climate and the richness and variety of their productions, but at best they can never constitute more than a very small portion of the whole region.

There is some pasturage in the regions not adapted to cultivation where herds and flocks, more or less nomadic, have been pastured and will continue to be grown as in other dry regions, but the capacity of the country in this direction is small as compared with the regions favored with more abundant rains.

The wealth of its mineral resources has been alluded to at various times in this paper. This is justly celebrated because of its great variety and enormous abundance. When I first visited the State twenty-four years ago, there were then recorded an almost innumerable number of mining claims and it was said that more than six thousand mining companies were then in existence. While but a very small proportion of this vast number have proved profitable, it is still true that many towns, villages, and even cities have been built up at various mining centres. But mineral wealth alone, especially if of the precious metals, never builds up a continuously prosperous State; that is only founded on agriculture where people wish to build permanent homes.

The romances of sudden and great wealth, acquired from the mines in these regions by persons earlier in humble circumstances, are familiar to the whole world. Some, who began as poor laborers and low in the

social scale, but who have died among the millionaires, are known the world over, yet such do not make a prosperous State. Nevada, the only State within the basin, has steadily declined in population in late years, until now the entire population on its more than 100,000 square miles would scarcely be sufficient for a fifth-rate eastern city. The very men who have made great fortunes in Nevada go elsewhere to enjoy their wealth notwithstanding its healthy climate, and I fear this will be the case for a long time to come. Nevertheless because of the abundance and the wide distribution of mineral wealth, the mineral resources of the basin must ever continue to be great in the aggregate.

Portions of this subject have grown to greater length than I intended, because of the richness of the matter, and I have scarcely alluded to several items that I had desired to speak of more in detail. One is the exceedingly rapid evaporation that takes place or may take place from its soils and its lakes. By actual experiment it has been found in some places to be a half an inch per day or fifteen inches per month, and it is no wonder that under such conditions large portions are desert.

In certain places Artesian wells are practicable, but inasmuch as their capacity depends upon the amount of water falling on the mountains or hills which constitutes the source of their supply, they can never be of extensive use or success except in very limited areas. They may however be the means of making the establishment of stopping places and stations practicable in regions now difficult to be traversed because of the long stretches between existing supplies of water.

In conclusion I will say it must ever be a region of peculiar interest to the geologist, the botanist and the mineralogist, and will be more and more visited by general tourists in search of new scenery and aspects of nature unlike those found in more rainy regions; that while as a whole it can never have more than a sparse population as related to its size, yet because of its vast area, and because of the great fertility of particular spots, it probably will have ultimately a very considerable population in the aggregate. It will have here and there localities which will become places of resort for those seeking health, for those suffering with ailments which are benefitted by a dry and warm climate. It will ever be an intensely interesting region because of its strong contrasts between inhospitable desert and productive fertility; and despite its general desolation it will be visited because of its inherent and especial beauty.

Yale University, December, 1888.

GEOGRAPHICAL NOTES.

INTERNATIONAL GEOGRAPHICAL INSTITUTE.—This Institute, which is to be opened in Paris towards the end of the month of July, will comprise a reading-room, a permanent exhibition of apparatus and instruments for the use of explorers, and a school of gratuitous instruction for travellers.

M.-D. Kaltbrunner, a distinguished geographer, to whom is due the idea of the enterprise, will give in the chief cities of France a course of lectures on the "Art of Travelling;" the proceeds of the course to constitute the nucleus of a "Fund in Aid of Explorers," of whatever nation. It is hoped that other lecturers will lend their assistance to the work.

Communications may be addressed: M.-D. Kaltbrunner, géographe, Champigny-sur-Marne, près Paris.

SUMMER HEAT.—It may help the philosophy of those who are compelled to endure the ordinary American summer to know that the Government Geologist of South Australia, who has lately returned from an exploration in Alexandra Land, reports a heat of 124° in the shade. Neither Aden, nor Massowah, nor Fort Yuma can do better, or worse, than this.

THE GEOLOGICAL MAP OF NEW JERSEY.—This map,

which is sheet No. 20 (and the last) of the Atlas of New Jersey, brought out by the Geological survey of the State, under direction of Prof. Geo. H. Cook, is drawn on a scale of 5 miles to an inch. The formations lie with unusual regularity northeast and southwest across the State.

The southernmost and largest is of yellow gravel and sandy clays; next come fire clay and sand and clay marls; then trap, red sandstone and shales; then gneiss, granite and limestone; then Hudson River slates, and at the northern end sandstone.

THE FLOODS IN PENNSYLVANIA.—Towards the end of the month of May long-continued rains in Central and Western Pennsylvania did great damage; but all other loss seems as nothing in comparison with the destruction that fell, in the afternoon of May 31, upon the Conemaugh Valley, in Cambria County.

The Valley is a narrow gorge cut by the Conemaugh River through mountains rich in coal and iron and limestone, which supplied the industries of many towns and villages. At the upper end, and at an elevation of about 300 feet above the river, was a body of water formerly known as Conemaugh Lake. This lake, originally a ravine, had been formed by a dam, between 800 and 1000 feet long, built across the lower end.

The height and thickness of the dam are not accurately given, but an engineer familiar with it affirms that it was equal to any ordinary pressure. At a level of 7 feet below the top of the dam, the water of the lake covered a surface three miles in length by more than a mile in width.

The inflow from the rains raised this level on the 31st of May at the rate of ten inches an hour, and at 1 o'clock P. M., when the engineer walked over it, the top of the dam was three inches below the water, which was beginning to cut a channel for itself.

Of what material was the work that yielded so soon? Less than two hours after, the dam gave way and the flood poured down the valley. The three miles of water were drained out, says the engineer, "in forty-five minutes."

Warning of the danger had been sent by telegraph early in the day, but there were many whom it did not reach.

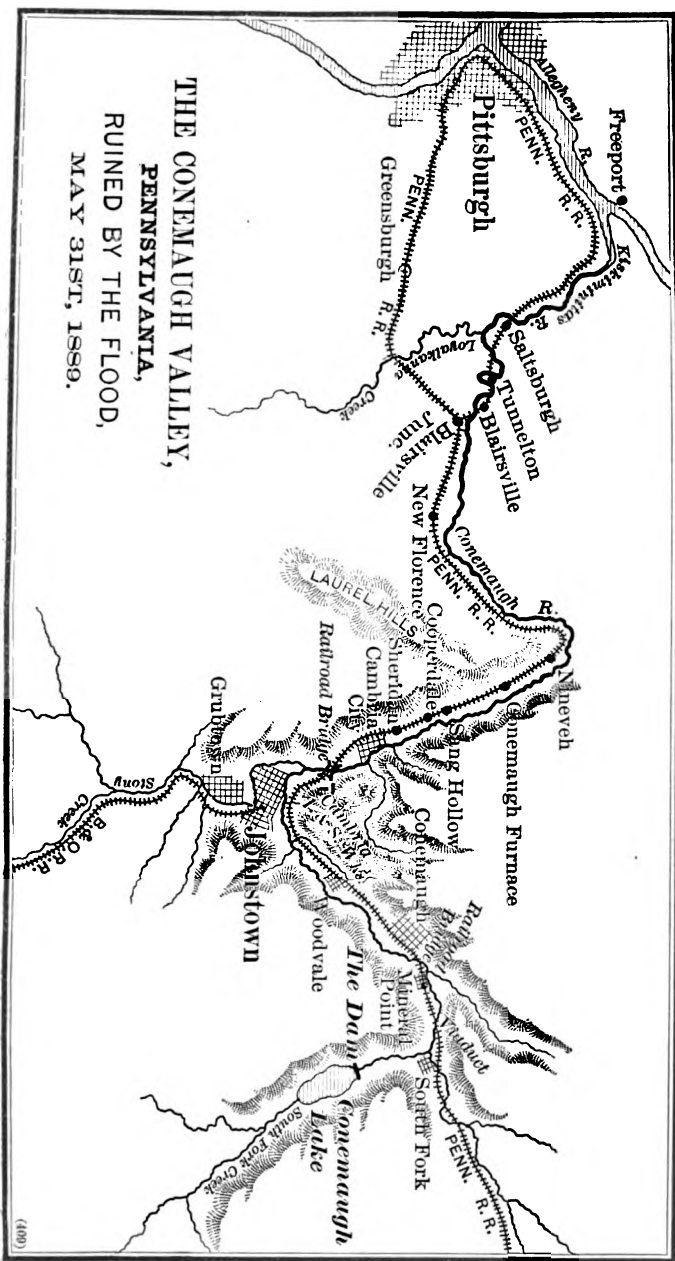
Everything in the path of the torrent went to ruin. The smaller towns and villages have been annihilated; and the loss of property amounts to many millions. At Johnstown alone, 13 miles from the lake, the damage done is summed up at not less than \$20,000,000.

The number of those who perished may never be rightly known; but men begin to believe that the estimate of 8,000 may fall short of the truth.

No calamity of equal magnitude is recorded in the history of the United States.

THE SACO RIVER.—The *Scottish Geographical Magazine* for June publishes the dates, supplied by Mr. John M. Batchelder, Cambridge, Mass., of the opening and closing of the Saco River, *in that State*, as observed by him for a series of years beginning in 1820. The Saco, it is added, is situated in lat. 43 31' N., long. 70° 26' W.

Not even the best will in the world can bring this position within the limits of the State of Massachusetts,



and the table of dates is, therefore, less useful than it might be.

CLIMATOLOGY OF BRAZIL.—Mr. H. Morize begins, in the January number of the *Revista do Observatorio*, of Rio de Janeiro, a sketch of the climatic conditions of Brazil. The metrical system is employed throughout. There are three great zones in the Empire. The first, which is called the torrid, or tropical, comprehends the part of the country in which the mean temperature exceeds 25° (77° Fahr.) The line that marks off this zone passes to the S. of Pernambuco, through Alagôas, or Sergipe, cuts off a section of Goyaz and comes out in Matto-Grosso below Cuyabá.

The provinces of Pernambuco, Parahyba, Rio Grande do Norte, Ceará, Piauhy, Maranhão and Amazonas, are entirely within the tropical zone.

The second zone, the hot or sub-tropical, lies between the isotherms of 25° and 20° (77° and 68° Fahr.). The line of 20° passes through the southern part of the province of S. Paulo, leaving to the S. a fraction of S. Paulo, the larger part of Paraná, and the entire provinces of Santa Catharina and Rio Grande do Sul.

The third or temperate zone lies S. of the second, and includes the provinces of Paraná, Santa Catharina and Rio Grande do Sul, with a portion of S. Paulo. The mean temperature varies between 15° and 20° (59° and 68° Fahr.).

The tropical zone may be subdivided into three parts: 1st, that of the Upper Amazonas, 2d, that of the interior of Maranhão, Pará, Matto-Grosso, Piauhy, (and as far as Bahia and Minas-Geraes), and 3d, the coast re-

gion of Pará, Piauhy, Ceará, Rio Grande do Norte, Maranhão and Parahyba. In the Upper Amazonas there is a greater rainy season, which begins at the end of February, and lasts till June, and a season of lighter rains, which begin in the middle of October, and cease early in January. Both make the rivers overflow, and there is a difference of nearly 46 feet in level between the lowest stage of the water, in September, and the highest, which occurs in April or May. There are two dry seasons, a long one from the first of July to the middle of October, and a short one from January to February. At the close of the heavy rainy season, there is for a few days a lowering of the temperature to such a point that it is said many of the fishes in the River Teffe die at this time,

According to Mr. J. Pinkas, chief engineer of the projected Madeira-Mamoré Railway, the mean temperature on the Upper Madeira is 26° (79° Fahr.) and the highest $39^{\circ} 5'$ (102° Fahr.). The heat is oppressive, because of the humidity, the hygrometer varying constantly between 80 and 100. The condensation which takes place immediately after sunset is so great that men sleeping under thick tents find their clothes wet in the morning, and the tent cover soaked as if a heavy rain had fallen.

In this part of the Amazonas the prevailing wind is from the S. W., with frequent calms, and a lowering of the temperature. These calms occur in March, April and May, and the cold is produced by the descent of the icy air from the summits of the Andes. The arrival of this cold current takes place always a few hours after the sun has passed the meridian, and is invariably preceded by a very high temperature, with an atmosphere

saturated with moisture and a barometrical depression of from 5 to 6 millimetres.

These rapid changes occur in the whole intertropical zone of the Continent. They are also met with in the interior of all the Northern provinces, where a fall of 20° in a few hours is frequent.

In Matto-Grosso the prevailing winds are from the N.W. and the S.E., the former warm and moist, the latter always very cold. During the summer the pampa wind from the S.W. brings occasional storms with a fall of the thermometer.

At Cuyabá (the capital of Matto-Grosso) the mean temperature of the year 1876, was $27^{\circ} 7$, (82° Fahr.), and that of 1877, $26^{\circ} 7$ (80° Fahr.). The temperature is at daybreak from 4° to 6° (7° to 11° Fahr.), below that of midday, and it continues to rise until 4 or 5 o'clock in the afternoon, when it begins to diminish. Observations made for the months July–October, 1888, with excellent instruments left by the brothers Von Steinen, confirmed the previous record.

On the table-lands of the province it is not uncommon to see frosts in July (a winter month). In the coast-lands, the third subdivision of the tropical zone, the temperature is more equable. Here the rains occur in summer and autumn and are heaviest in April.

At S. Luiz de Maranhão ($2^{\circ} 31'$ S. Lat.) the annual rainfall is 2m .45 (96 inches), and the rainiest months are March and April. The range of the thermometer is very slight, and the wind blows all the year from E.N.E.

At Therezina, capital of Piahy, the temperature varies from about 78° to 83° Fahr.

During the dry season the wind blows from the S.S.E and E, and in the rainy season from the N. Thunderstorms are frequent in the months of May and September. At Amarante, in the same province, much the same conditions prevail, and the summer season sometimes passes without a single drop of rain.

The climate of Ceará, the province to the E of Piauhý, is also marked by regularity. It is only in the mountain region that the cold makes itself felt, and there the mean is in some places 25° , in others 43° Fahr. The distinction between the dry and the rainy seasons is more sharply defined, the former beginning in July and lasting till February and the latter covering the rest of the year. The mean annual rain-fall, deduced from 28 years' observations, was 1m .50 (59 inches). During the long, dry season, the plains, which feed the immense herds of cattle, are wholly burnt up by the sun, and the poor beasts retire to the woods, where they keep themselves alive on leaves and shrubs till the return of the rains, when in a few weeks the land that had been dried to powder is covered with the most vigorous growth of grasses. There are, however, seasons when the rain fails, and the cattle die by thousands, and the population suffers the extremity of famine.

According to one authority quoted, these droughts are periodical, the greatest occurring every 100 years and the less severe every 20 years, without counting seasons of partial drought. In 1792 not a drop of rain fell during the whole year, and the Captain-General of Pernambuco reported to the Portuguese Government that more than a third of the population had died of starvation.

The province of Pernambuco enjoys a climate somewhat fresher than that of the tropical zone and approximating to that of the warmer countries of Europe and the Mediterranean coast of Africa. In this province, as well as in Alagôas, Sergipe and the sea-coast of Bahia, rain falls throughout the year, though the greatest precipitation is in June, July and August. Observations at Recife (Pernambuco), the capital, which is only 10 feet above the level of the sea, establish a mean temperature of $26^{\circ} 2$ (79° Fahr.). The winds are: the south in the rainy season, the east and northeast in October, November and December, then again the south wind, except in March and April, when the southeast prevails.

HERR JUNKER.—In a note on p. xxvii. of the *Bibliotheca Americana Vetustissima*, Mr. Henry Harrisse remarks that "There is no dedication to *Ander Schiffahrt's* 2d voyage;" which seems natural enough to those who know that *Ander Schiffahrt* was not a man, but a Second Voyage. Mr. Harrisse himself understands the case better to-day than he did when he made his note, and he will be glad to learn that his navigator is no longer condemned to a lonely life.

The March number of the Royal Geographical Society's *Proceedings*, has, on p. 189, a brief notice of a new work: "El Dorado. Geschichte der Entdeckungen nach dem Goldlande El Dorado im XVI. und XVII. Jahrhundert," by Ferd. Adalb. Junker von Langegg.

The reviewer says that *Herr Junker's* book is the result of great research. The judgment may be sound, but to turn the Junker von Langegg into Herr Junker is not less bewildering than it would be to speak of the

Baron of Bradwardine as Mr. Baron, or Lord Palmerston as Mr. Lord.

CARTOGRAPHY IN RUSSIA.—M. Venukoff contributes to the *Revue de Géographie*, for April, an account of the progress of cartography in the Russian Empire.

The earliest map is that of the Italian Battista Agneze. This was found in 1884 in the library of St. Mark, at Venice, where the MS. still remains. It is in Latin, and bears the date 1525; and it has never been printed. Twelve years after this Anthony Wid, a Pole, brought out a map of European Russia, with a portion of Siberia. This served as the basis for Sebastian Munster's map in the *Cosmographia*, as well as for those of the various editions of Herberstein's *Rerum Moscoviticarum*.

In 1562 Jenkinson published, in London, a very detailed map of Russia and Tartary, which was reproduced the same year in the Atlas of Ortelius.

At the end of the XVI. century appeared the map known as the "Great Plan." This has now disappeared, but it was probably the original of the work produced by Theodore, the son of the Czar Boris, and engraved in 1614. On this engraved copy the meridians and the parallels are marked, the latter at intervals of 87 versts, while at the present day the degree is equal to 104.6 versts.

Three different maps were published between 1609 and 1612 by Isaac Massa, and towards the end of the XVII. century Russian cartography was illustrated by the works of Réméssoff and those of Witsen, the Amsterdam burgomaster, and friend of Peter the Great.

Peter introduced European methods, and formed a corps of thirty pupils of the Naval Academy, who worked during the years 1725-1740 on the map of Asiatic Russia. Charts of the Caspian and the Black Seas, the Sea of Azof and the Baltic were drawn during the reign of Peter by officers of the navy; and in 1745 the Academy of Sciences published at St. Petersburg an Atlas of the Empire.

As late as the middle of the XVIII. century the state of education in the country was such that very few persons, even of those belonging to the highest social position, knew how to make use of a map. Fifty years after the death of Peter, Catherine II., presiding in the Senate at a discussion which required geographical information, called for a map of Russia, and was answered that the Senate did not possess one. She handed some money to one of the secretaries, and sent him to purchase a copy of the atlas, published by the Academy thirty years before. Several of the Senators confessed that they had never heard of this atlas, and that they could not have used it if they had had it.

The foundations for exact cartography in the empire were laid by Catherine, who ordered that topographical surveys should be made in all the European provinces. The result of this work, continued through many years, was an atlas that remained the standard authority down to the time of Nicholas.

Great progress was made in Siberia, also, during the second half of the XVIII. century.

In 1822 a special corps of military topographers was created; and a number of triangulations were undertaken and carried through in various parts of European

Russia and of the Caucasus. Topographical surveys were made in Asiatic Russia, and special maps were prepared of such remote regions as the Kirghiz steppes, the Altai and Transbaikalia.

At the middle of the present century, Russia possessed : 1. For half of the European provinces a map on a scale of $1/420,000$, showing, besides the cities, all the villages and nearly all the roads, all the streams, etc. There were also topographical maps on a scale of $1/42,000$ or $1/84,000$, of Poland, the government of St. Petersburg, Esthonia, etc.

2. Maps, partly topographical, of the Caucasus, then not subjected to Russia.

3. For Eastern Russia and the Kirghiz steppes, a number of geographical maps on a scale of $1/840,000$ or $1/2,100,000$.

4. For the southern part of Western Siberia, a geographical map on a scale of $1/2,100,000$; and for the Altai Mountains, where topographical surveys had been carried out in detail, some special maps on the largest scale.

5. For Eastern Siberia there was, in 1850, nothing but Podzniakof's map of 1827; but the topographical survey, begun in 1848, was progressing under the Governor-General Mouravieff.

The marine charts of this period were numerous and good, and among them M. Venukoff mentions that of the Baltic and the Gulf of Finland, by Sarytcheff, Capt. Manganari's charts of the Sea of Azof and the Black Sea, Kolodkine's chart of the Caspian, and those of the coasts of Kamtchatka and Nova Zembla, by Lütke and Pakhtoussoff. The Russian voyages of dis-

covery in various parts of the world, during these fifty years, added largely to the collections of original charts. In 1819-1822 Anjou and Wrangel mapped the north-eastern coast of Siberia.

The second half of the century began with the establishment of special classes of geodesy at the Staff Academy. From these officers were sent to the Pulikova Observatory for instruction in astronomy; and they were then assigned to duty in the various provinces. Gen. Stebnitzky, who is now at the head of the topographical section of the General Staff, was among the earliest of the students at the Academy. It is mainly due to his labors that the Caucasus, which was finally conquered only about twenty-five years ago, is now more thoroughly mapped than any other portion of the empire, with the possible exception of Poland.

Besides a number of sheets of the great topographical map, which represents the relief of the surface of nearly all the western provinces, or governments, there is a special atlas, on a uniform scale, of 1/420,000 for the whole of European Russia. This atlas, made under the supervision of M. Strelbitzky, is composed of 145 sheets, and gives all the villages and hamlets, with the number of houses in each one. It is brought out in two styles: one on copper, from which the forests are omitted, and one on stone, with the forests. This atlas is regularly revised and corrected.

Among the very numerous cartographical works of the Russian Staff, M. Venukoff especially recommends Col. Bolcheff's "General Map of Asiatic Russia," including, on a scale of 1/4,200,000 parts of Persia,

Afghanistan and India, with nearly all China and the whole of Japan. It is, in M. Venukoff's opinion, the best map of the northern part of Asia ; and Matousovsky's "Chinese Empire" is, he affirms, superior to any other map of China.

Besides the Russian seas, many of the lakes and the rivers have been studied and mapped by skilful hydrographers.

The Imperial Russian Geographical Society has published, at its own expense, Tutikoff's map of European Russia, Schwartz's Southeastern Siberia, Oulsky's Chart, showing the depths of the Caspian Sea, two ethnographical maps of European Russia, etc.

The special maps issued by the Departments of Finance, of the Public Domain, and of Statistics, have been brought together by Mr. Ilyin and published as a Statistical Atlas, illustrating the material and intellectual progress of the nation. Mr. Ilyin is also the publisher of Von Tillo's many admirable maps.

THE TRANSCASPIAN RAILWAY.—Mr. Curzon, M. P., has lately made a journey in Central Asia over Gen. Annenkoff's great railway, and his observations are reported in the *Proceedings* of the Royal Geographical Society for May. He fully recognizes the skill and energy with which the Russians have done their work, but he does not seem to have been impressed, as M. Leclercq was, by the extraordinary difficulties of the undertaking. The main obstacle, which will always constitute a danger to the line, was the shifting sand, blown by the desert winds. Apart from this difficulty, Mr. Curzon is disposed to think that the road was the easiest and simplest ever

built, the region traversed being as flat as a billiard table for almost the entire distance of nearly 900 miles from the Caspian Sea. The journey is made in 72 hours. At the stations along the road, 61 in number, good refreshments are to be had, with very fine water-melons at less than 1 d. apiece, and grapes for a third of a farthing per lb. On the Kara Kum, the sights were an occasional group of Turkoman tents, the small clay watch-towers and the rectangular forts, and, more rare, the circular barrows or *kurgans*. The moving objects were, here and there a crow, or a camel, and the frequent sand columns caught by the wind and sent, giddily revolving, across the plain. In the distance a perpetual mirage converted the wilderness into lakes of water and floating islets of trees.

Merv, which fills so large a space in imagination and in books of travel, is a little place of two or three streets, and about 1000 inhabitants, but the country for miles around is covered with the ruins of the three ancient cities that bore the name. The desert beyond the oasis, which has an area of about 1600 square miles, is characterized as an "appalling" ocean of sand.

Gen. Annenkoff's bridge over the Oxus, built, as Mr. Curzon says, in 103 days, is, necessarily, a temporary structure of timber.

Bokhara, nominally independent, is to be regarded as a part of the Russian dominion in Asia. For the 150 miles between the capital and Samarkand, the terminus of the railway, the land is one fruit garden.

The military and political significance of the Trans-caspian road naturally has an interest for Mr Curzon, but he remarks that its immediate effect has been to se-

cure to Russia the advantage over England in the competition for the trade of Central Asia.

THE OASES OF SOUTHERN TUNISIA.—The *Compte Rendu* of the Paris Geographical Society for the 1st March, reports an address made by M. Ed. Blanc, who went to Tunisia in 1885 to study the problem of arresting the encroachments of the sand dunes on the oases in the South. The methods which had proved successful on the French coasts were, he found, not applicable in Tunisia, with the immense expanse of the sand, its dryness and mobility, and the violence of the winds, added to the scarcity of materials for the work and the want of water, which made it impossible to consolidate the shifting sands by means of plantations. One by one these difficulties were overcome.

M. Blanc described four groups of oases, the Aarad, the Djérid, the Nefzaoua, and the fourth composed of the oases situated on the prolongation of the line traced by the southern base of the Aurès Mountains. Remarking the contrast between the richness of these fertile spots and the sterility of the surrounding desert, in which, nevertheless, the numerous Roman ruins proved that different conditions once existed, M. Blanc was led to consider the causes which had brought about so great a transformation. He did not believe this was due to the destruction of irrigating works, nor to the alternation of periods of drought with periods of humidity; and still less did he accept the theory that man had wrought the desolation by cutting down the forests. He believed the aridity of the Sahara to be the result of general geographical causes brought into action by

modifications in the very form of the continents, such as the elevation of the Central Asiatic steppes and the progressive disappearance of the snows that covered during the glacial period many of the mountains in Europe, and, perhaps, also in Africa.

It will not recommend M. Blanc's explanation to all men to add that he attributed part of the effect to the subsidence of Atlantis. These various causes, he argued, diminished the quantity of moisture brought by the winds to this part of Africa, and, the equilibrium once broken between the amount of the rainfall and the evaporation, there ensued a progressive aridity now practically beyond remedy.

If not to be cured, the sterility of the desert may yet be modified by means of artesian wells. It must be remembered, however, that the supply of water from this source never can be very great, since the establishment of a second well in the neighborhood of the first sensibly diminishes the yield of this one; and irrigation of the whole country is, under the circumstances, an impossibility. The consumption of water for irrigating purposes in the oases is, on an average, about three-fourths of a pint per second for every hectare (about two and one-half acres). At this rate there would be needed for the yearly irrigation not less than forty inches of water, or ten times the amount of the rainfall; and this is evidently far greater than any possible supply from artesian wells.

A real transformation of the Sahara into a region susceptible of cultivation may be looked for, in M. Blanc's opinion, when the progress of science shall have found the means of subjecting and utilizing the great

natural forces, such as the rise and fall of the tide, which is strongly marked in the Gulf of Gabes, and the solar heat, and applying them to the distillation of fresh water from the sea. The problem, in either case, is theoretically simple, and the practical solution of it can only be a question of time.

SLAVERY IN THE CONGO STATE.—E. F., who may or may not be Ernesto Farina, writes in the *Bollettino* (Marzo-Aprile) of the *Società Africana d' Italia* that slavery exists in the Congo Free State, having been gradually established on the upper river; and he refers to one Station near Stanley Falls which has enjoyed the distinction of being less expensive to the State than others, for the reason that labor at this Station was wholly performed by slaves. When the Arabs captured Stanley Falls in 1886, some of the Houssas (Hausa) escaped in a canoe, and were taken by the natives at Upoto. A Government steamer, sent for the purpose, recovered all but two or three of these men, and the officers purchased (*redeemed* is E. F.'s milder term) from the Upoto people some of their own slaves. These slaves the officers set to work at the Station. Other fruitless visits were made in search of the Houssas, (who, as British subjects, could not be abandoned to slavery) and at every visit the number of slaves offered for sale on the river bank increased. These were purchased by the Belgian agents for cotton goods, brass, iron wire, and the like. The trade went on, till one day the Government steamer arrived towing a large number of canoes filled with black soldiers. These landed under the protection of the steamer's guns, attacked and burned an Upoto village,

and carried off thirty-five or forty women and children. These were taken to the Station and made to work for their captors, until they were ransomed at the rate of four slaves for a woman and two for a child. There are still other ways of procuring slaves. A European on a hunting excursion, wounds an animal, which escapes, but is afterwards found by some natives, who take the flesh for their own use, according to the native custom. The Belgians demand payment for the animal, and the natives refuse to pay ; and the Europeans resort to their unflinching argument.

It is falsely affirmed, according to E. F., that the slaves are better treated by the Belgians than by their native masters, and he recites the following instance :

A Belgian officer one day condemned a native woman, his personal slave, to be held face downward by four Houssas while a fifth flogged her with a whip of hippopotamus hide. The officer stood by and saw this done. A missionary, who heard of this infamous act, reported it to the Governor-General, but the officer kept his place.

E. F. has made several mistakes. In a matter so grave he should have given his full name, although the *Società Africana d' Italia* answers for him.

He should also have given the names of the Governor-General and the missionary and the Belgian officer, and, if he had them, the dates of the abominations he describes. To know of such things, and to spare in any way the men who do them is to be guilty of treason to humanity.

The civilized world is responsible for the establishment of the Congo State, and it is impossible to read without shame, in the light of E. F.'s revelations, the passage on p. 67 of the same *Bollettino*, in which Vice-

President Florenzano declares that the European activity in Africa is "*the development of the right inherent in the higher races to civilize and to improve those that are below them.*"

THE NEWS FROM STANLEY.—Letters received in London, on the 1st of April, told of Stanley's safety; and one of these, published simultaneously in the *Proceedings* of the Royal Geographical Society and in the *Scottish Geographical Magazine*, gives the details of the extraordinary journey through the Central African wilderness.

For the hardships endured and the dangers encountered this journey resembles the yet longer and more perilous march of Gonzalo Pizarro to the Napo and the Amazon.

The expedition left Yambuya on the 28th June, 1887, with 389 rank and file and 180 supernumeraries.

The objective point was Kavati, 322 geographical miles almost due E. from Yambuya, and the intervening country was absolutely unknown. On the 15th of December, after toiling through a seemingly endless forest and fighting with the natives and enduring many losses by disease and privation, the party reached a point whence they looked down on the Albert Nyanza, nearly 3000 feet below them. Here the opposition of the natives turned them back, and it was not till the 29th of April, 1888, that Stanley finally met Emin Pasha and Capt. Casati. He left them again on the 25th of May.

Following the Aruwimi River from Yambuya, Stanley traced it up to its source, on the edge of the Albert

Nyanza, and 800 miles from the Congo. He found that the Nepoko was a tributary of the Aruwimi, and that this, like so many other African rivers, bore many names. For 300 miles from its source it is called the Ituri, then, successively, Itiri, No-Welle, Nevoa, Suhali and Biyerre; all marked on Stanley's map, sent with his letter. Another name, *Dudu*, is omitted. For nearly the whole distance travelled the river flowed through an immense forest, like those of South America and Farther India, swarming with animal life and matted with vegetation. The picture of it is impressive :

"Take a thick, Scottish copse, dripping with rain; imagine this copse to be a mere undergrowth, nourished under the impenetrable shade of ancient trees ranging from 100 to 180 feet high; briars and thorns abundant; lazy creeks meandering through the depths of the jungle, and sometimes a deep affluent of a great river. Imagine this forest and jungle in all stages of decay and growth—old trees falling, leaning perilously over, fallen prostrate; ants and insects of all kinds, sizes and colors murmuring around, monkeys and chimpanzees above, queer noises of birds and animals, crashes in the jungle as troops of elephants rush away; dwarfs with poisoned arrows securely hidden behind some buttress or in some dark recess; strong, brown-bodied aborigines, with terribly sharp spears, standing poised, still as dead stumps; rain pattering down on you every other day in the year; an impure atmosphere, with its dread consequences, fever and dysentery: gloom throughout the day, and darkness almost palpable throughout the night. . . .

"The mornings generally were stern and sombre, the sky covered with lowering and heavy clouds; at other times thick mist buried everything, clearing off about 9 a. m., sometimes not till 11 a. m. Nothing stirs then; insect life is still asleep; the forest is still as death; the dark river, darkened by lofty walls of thick forest and vegetation, is silent as a grave; our heart-throbs seem almost clamorous, and our inmost thoughts loud. If no rain follows this darkness, the sun appears from behind the cloudy masses, the mist disappears, life awakens up before its brilliancy. Butterflies scurry through the air, a solitary ibis croaks an alarm, a diver flies across the stream, the forest is full of a strange murmur, and somewhere up the river booms the alarum drum." . . .

Out of this dense growth the expedition came at.

once upon open, grass land, that stretched to the height above the Albert Nyanza. Stanley reports that this lake is rapidly decreasing in size. This decrease is due, he says, to the wearing away of the reefs that obstructed the Nile below Wadelai.

Just after parting with Emin, on the shore of the lake, Stanley saw, quite fifty miles away to the southwest, a snow-covered mountain, higher and more regular in outline than Mt. Gordon Bennett, discovered and unfortunately named by himself. This higher mountain may be, he writes, the Ruwenzori, "which the natives said had something white like the metal of my lamp on the top."

He looks upon the country lying between the Albert Nyanza and the lake he discovered in 1876 (the Muta-Nzige) as promising curious revelations; and he declares himself uncertain, at the time of writing (Sept. 1, 1888), whether the Muta-Nzige belongs to the system of the Nile or to that of the Congo.

If this letter has dispelled some of the apprehensions felt with regard to Stanley and to Emin Pasha, it still does not tell a complete story. The march to the Albert Nyanza was undertaken, as the world believed, to rescue Emin Pasha and his faithful comrades from deadly peril. Nothing is said of this peril in the account of the meeting; nor, though Stanley passed four weeks with Emin and Casati, could either of them find time to write a letter, or to send a message to his friends in Europe. These omissions do not explain themselves; neither is it easy to understand why, if any information was to be given, the outside world should have been left to guess at the plans and the future

movements of the rescuer and the rescued. It is possible that the real purpose of Stanley's expedition has never been told.

THE PORTUGUESE IN NYASSA-LAND.—Under this title, Mr. J. Batalha-Reis, of the Lisbon Geographical Society, contributes to the *Scottish Geographical Magazine*, for May, a compact and solid article on the Portuguese priority of right as discoverers and explorers in the vast region of Central Africa, somewhat vaguely described as Nyassa-Land. Mr. Batalha-Reis wastes no sentiment on the matter, but proves, by citations of chapter and verse from books within reach, that his countrymen, in the sixteenth and seventeenth centuries, knew and visited the Shire River and the Nyassa Lake. He shows, also, that the Portuguese Government has always made its authority felt in the far interior, and that the native chiefs, whether submissive or antagonistic, have never ceased to recognize the Portuguese power.

All this is, without doubt, an old story to those who have paid some attention to the history of the early explorations in Africa; but it was necessary to state it once more, and especially in English, first of all, because as Eulenspiegel says, "that which is known from of old doth no man regard," and next, because Englishmen having designs of their own on Nyassa-Land choose to pretend that Portugal has no rights in that part of Africa.

Most English-speaking persons are content to err with Livingstone on this subject, and Sir Richard Burton might well have been more severe when he wrote: "With the greatest admiration of Dr. Livingstone's

thoroughness, I am compelled to own that he has done scanty justice to that little, but heroic, nation which pierced for Europe a new pathway to the East. In fact, the very mention of Portuguese explorations seems to act upon him as a red rag," (quoted by Mr. Batalha-Reis, on p. 260).

It was eminently fit that an unanswerable statement of the historical truth concerning these matters should appear in the *Scottish Geographical Magazine*, which published about a year ago (in Vol. IV., p. 305) the opinion, no less cautious than courageous, that "German claims might be satisfied, and Portuguese claims should be overlooked, in securing the free navigation of the Zambesi to the flags of all nations."

LOURENÇO MARQUES.—Besides the railroad which is to unite it with Pretoria, in the Transvaal, and the electric lights for which the Town Council has invited tenders, Lourenço Marques has other cares. It has just been threatened with a revolt of the Hindoos, who hold so much of the East African trade in their hands.

The movement on the part of the Banians was serious enough to justify the issue of supplements to the handsome weekly paper, *Districto de Lourenço Marques*, but the provoking cause of the disturbance has its humorous side.

On the 11th of March last the Town Council made an ordinance requiring the Banians and the native Africans, in the interest of public decency, to wear trousers. The Africans received the order with bare indifference, but the Hindoos took it as an affront, and appealed, after much turmoil, to the Governor-General of the Prov-

ince, who telegraphed a message to suspend the execution of the decree. Upon this the Town Council met in extraordinary session. Many speeches were made, and a flood of light was thrown upon the historical relation of Hindoos to trousers, and, finally, the Council unanimously re-affirmed the ordinance. The Governor-General was duly informed of this action, and gave way, leaving the municipality to manage its own affairs.

THE ASCENT OF KILIMANJARO.—On the 12th of November, 1888, Mr. Otto E. Ehlers set out in company with Dr. Abbott, an American naturalist, to make the ascent of Kilimanjaro. In his lively account, published in *Petermanns Mittheilungen*, 35 Bd., III., Mr. Ehlers says that he was delighted to have a companion, because four eyes see better than two, while hardships are diminished by half and enjoyments increased tenfold, and, finally, because in Africa, more than anywhere else, it is the traveller's duty to neglect no one matter of interest that may present itself.

The first camp was at the foot of a small crater to the south of Kimawenzi, which lies E. of Kibo, the higher summit. The night was cold—they were at an elevation of 9800 feet—and the next morning one of the three native soldiers, whom Mr. Ehlers had provided a few days before with warm clothing, quietly stole away, clothes and all. Mr. Ehlers consoled himself with a quotation from Faust ; and the other soldiers lost no time in following their comrade.

As a preliminary training for Kibo, Mr. Ehlers climbed Kimawenzi to a height of more than 16,000 feet. To go higher than this on a mountain so jagged,

and so cut up by deep gorges, he believes to be, though he will not say it is, an impossibility. In the afternoon of this day three antelopes of a new species were seen, at a height of nearly 12,000 feet. The next two days were passed in reconnoitring and in collecting specimens. The third day a place was selected for a camp, and here fifteen of the men were left ; ten were sent back to Marangu for supplies, and, with five others, Mr. Ehlers and Dr. Abbott set out for the snow region. They came upon it very soon, for during the night snow had fallen, and their men were at first like children in their pleasure at the sight, though their bare feet soon began to suffer, and they cried out that they were going to die. They kept on, however, stoutly enough, till their advance was stopped by a precipice, and Mr. Ehlers found he had repeated Dr. Meyer's mistake of taking a path that led towards Kimawenzi. They encamped for the night, and had hardly done so when there came on a snow storm as furious as any ever known in the far North. The next morning was splendidly clear, with a still air and a cloudless sky. After crossing some lava ridges, the travellers passed to the north of the chain of hills between Kibo and Kimawenzi. The snow was six inches deep on the loamy ashes, over which they slipped and struggled. The night of the 17th, when the last camp was reached, was still, with bright moonlight ; and the next morning the road was plain and smooth as a floor over the hard, frozen surface. Before long, however, this was succeeded by blocks of lava and hills of ashes. At 7 o'clock the two explorers had reached an altitude of 17,000 feet, and enjoyed a magnificent view of the great

Masai plain below them, stretching northward from Kibo. Here Dr. Abbott's strength failed, and Mr. Ehlers had to go on alone.

He had climbed a thousand feet higher, and had just comforted himself with a pull at the brandy flask, to the health of a distant person, when his *alpenstock* slipped from his hand, and lodged nearly 200 feet below him. He recovered it, thinking meanwhile how slight a thing, in such a place, might reduce him to helplessness. About 10 o'clock he reached the ice-cap, that covered the mountain top. It was impossible to climb this wall of ice, and, after turning around it, he descended the mountain for some distance, and found on the N. W. side an approach that gave him a wide view of the summit. There was no sign of a crater, but the undulating surface lay before him covered with snow.

Mr. Ehlers finds that the measurements made by Dr. Abbott and himself do not agree with those of Dr. Meyer, but he is convinced that the mountain is nearly 20,000 feet high (6000 metres). At 16,400 feet he found the tracks of an elephant, besides those of antelopes and buffaloes, as well as the last sign of vegetation in a species of everlasting flower.

Den østgrønlandske Expedition udført i Aarene 1883-85, under Ledelse af G. Holm. 2 vols. Kjöbenhavn, 1888; (with French Résumé of the 2d vol.) from the author.

Capt. Holm's book gives an exhaustive account of Eastern Greenland, its geography, geology and ethnography, and it is not easy to believe that there remains much to be gleaned after him and his fellow-workers in the expedition of 1883-85. The opening dissertation on

Ósterbygd (of which no traces were found) is by Dr. Steenstrup, the report on the expedition and the geographical description are by Capt. Holm and Lieut. Garde, the geology is treated by Drs. Knutsen and Eberlin, the botany by Prof. Lange, and the comparative study of the meteorological observations is made by Prof. V. Willaume-Jantzen. In Vol. II., Dr. Søren Hansen writes of the anthropology and Capt. Holm of the ethnology. Mr. Johannes Hansen is responsible for the list of the inhabitants. Dr. Rink explains the East Greenland dialect, and adds valuable notes to the legends and tales collected by Capt. Holm.

The coast has been carefully mapped from Cape Farewell in $59^{\circ} 49'$ up to $68^{\circ} 45'$ N. Lat., including the numerous *fjords* that run so far into the land.

East Greenland as defined by Capt. Holm has five natural divisions, marked by points along the coast. These are: from Cape Farewell north to Auarket, from Auarket to Ikermiut, from Ikermiut to Igdloluarsuk, from Igdloluarsuk to Inigsalik, and from Inigsalik to the point where the exploration ceased. In the second and the fourth divisions, the land ice comes down to the edge of the water, but in the other three the *fjords* are walled in by high and steep mountains. The general direction of the *fjords* towards the sea is a little south of east, while on the west coast of Greenland the direction is south-westerly.

The most interesting part of the work is that which describes the inhabitants of Angmagsalik, a region lying between 65° and 66° N. Lat. These people had never come in contact with the civilized world until they were visited by Capt. Holm's party.

They number 548 persons, 245 of them males. In stature they exceed the Greenlanders of the south and west, the average height of the Angmagsalik men being about 5 ft. 3 in., and that of the women not quite 5 feet. They are fairly well developed in the upper part of the body, but the legs are short and thin and comparatively weak, and Capt. Holm is disposed to think that this feebleness is due to the close confinement and cramping of the limbs on board of the *kayaks*, in which the men pass their days.

The complexion of these East Greenlanders is a yellowish brown, lighter in the women than in the men. Their eyes are brown, and the hair, which is thick and smooth, is dark brown or black.

The climate is milder than that of the western coast, but the vegetation is almost confined to heaths and mosses. The sea furnishes the principal means of subsistence. The only domestic animal is the dog.

The people call themselves *Inik*, or *Ták*, that is, *men*. In the winter they live in houses made of stone and turf, with but one room, from 24 to 50 feet in length—according to the number of families united in it—and from 12 to 16 feet in width. The site is generally a sloping ground near the sea, and the windows look out on the water. As many as ten families sometimes occupy the same house, and the oldest man is regarded as the head, if he has been or is a good hunter, and has sons distinguished in the same way; and this is the only distinction recognized. When the spring comes, and the tent life begins, the large community separates, and none but the kindred remain together. The inhabitants of one house

are often at enmity with those of another ; which looks like civilization.

Theft is not uncommon, and murders are frequent, for so small a population. There is no public recognition of these crimes other than the songs sung alternately by the parties on both sides, in the presence of an audience, which approves or disapproves. Between the songs, the adversaries display no ill-will, but treat each other as if there were no cause of trouble between them.

These contentions, with the accompaniment of the drum, are not decided by one trial, but are repeated very often, so that they sometimes last for years.

The ties of blood impose the obligation of mutual help. On the other hand, marriage is not held to be a family tie, and the wife is treated as a servant to be dismissed at pleasure. If she has a child, her position is more secure. The men marry as soon as they are in a position to maintain a wife. Skilful hunters have often two wives, but there is no instance known of a greater number.

Longevity is not common in East Greenland. Six or eight persons, and certainly not more than ten, are supposed to have reached the age of from 60 to 70 years. When a man dies, the body is dressed in the best winter clothes, the head is covered with a hood, and the legs are tied together. The corpse is then dragged out of the house by the ordinary passage, or through the window, and thrown into the sea, or left for the tide to carry away. If the sea is frozen, the body is pushed through a hole in the ice. Sometimes the burial is after the ancient fashion of laying the body on the rocks, and covering it with stones ; but in either case the weapons

and tools of the deceased are laid near him. Mourning for the dead is manifested by lamentations and groans, and abstinence from certain indulgences; and the name of the dead man must not be pronounced. Any one who bears the same name must find another; and if the deceased was called by the name of an animal, or an object, or an idea, the word must be changed. These changes being accepted by all, it follows that the language undergoes great modifications.

Man is composed of three parts: the body, the soul, and the name (*atekata*). The body, of course, is perishable. The soul, which lives in the man, is extremely small, not larger than a finger or a hand. If it falls sick, or dies, the man goes with it. When the man dies, the soul returns to life, either in the sea or in the air. Both are good places, but the sea is to be preferred.*

The *Atekata*, or name, is as large as a man, and enters into the child when it is born and rubbed around the mouth with water, while the names of those after whom it is to be called are pronounced. When a man dies, the *Atekata* stays near the body until a child is named after the deceased. It then enters into the child and continues its existence. Children that die, whether naturally, or by violence, go to heaven and there produce the *Aurora Borealis*, which is called after them.

* Capt. Holm quotes from Johannes Hansen, on this subject: "(They believe that) a man has many souls. The largest live in the throat and in the left side of the man, and are little men about the size of sparrows.

"The other souls, which are of the bigness of a finger-joint, live in the other parts of the man's body.

"When the *Angekoks* (sorcerers) take away one of the souls, the part of the body thus treated falls sick. If another *Angekok* finds the soul and restores it to its place, the man regains his health; but if this cannot be done, the man dies and the soul goes off on its wanderings."

There is a story among these Eskimos that Greenland is an island, and that long ago a man named Uyartek went round it. It is hardly credible that people in their state of intellectual development should be able to conceive the idea of a vast territory like Greenland, with its relation to the sea and to other lands, and the story is, most probably, to be understood of some island on the coast.

It is to be hoped that this very interesting book may be made accessible to a larger public in an English or a French translation, with the numerous illustrations, almost uniformly excellent, and the maps, which are beautiful specimens of work.

Geografia Etnologica e Storica della Tripolitania, Cirenaica e Fezzan, con Cenni sulla Storia di queste regioni e sul silfo della Cirenaica, per Ferdinando Borsari, (from the Author.)
Napoli, 1888.

Professor Borsari says in his preface that, looking to the probable changes in the near future in the relations of the lands lying between Tunisia and Egypt, he felt that some such work as this was especially called for in Italy. He regrets his own shortcomings and the unavoidable breaks in the narrative, not to be filled up until the regions to the east of Tunisia have passed under the control of some enlightened government. If the present work finds favor, the author will bring out another on the physical and economical geography of these countries, illustrated by a geographical and historical map. Such a task could not be put into better hands, and Prof. Borsari would do a kindness to students of all nations by completing

what he has so well begun. His book has been called a compilation. It is a compilation, so far as the name implies industry on the part of the writer ; but it is also an independent and critical work, in which the author has used and systematized materials, has rejected and interpreted authorities, and has brought the whole into order with adequate learning and judgment. There are persons who weary of meeting the same names in history, and are ready to quote Emerson without understanding him : " How often must we say Rome and Paris and Constantinople ! " True ; but if you will read what men have done you must read these names, and others. In writing of the Mediterranean lands, once so highly civilized, Prof. Borsari has to go to the fountain head.

He begins with the megalithic monuments, and then considers successively the fair-haired Libyans, the origin of the Libyans, the North-African ethnology, the Berber language and the Berbers (whose Vandal origin he rejects), and the present inhabitants of Tripolitania, Cirenaica and Fezzan.

* The historical portion of the geography is studied with the same care, and the descriptions of the Syrtes, the mountain-systems and the hydrography bring to-

* In a reference to Pindar, on p. 75, Prof. Borsari quotes from Giosuè Carducci a passage in which the Italian poet has repeated, consciously or unconsciously, Gray's superb lines :

" Or the pride and ample pinion
That the Theban eagle bear,
Sailing with supreme dominion
Through the azure deeps of air."

Carducci :

" . . . aquila trionfale
Distende altera e placida il remeggio de l'ale
Ne 'l fulgente meriggio su i fôri e le città."

gether in a few words what is known concerning these subjects.

There are two bibliographical lists and one table, the preparation of which must have cost great labor. This table shows in parallel columns the names of places from Scylax, Strabo, Pliny, Ptolemy, the Antonine Itinerary, the Peutingerian Table, the Stadiasmos of the Great Sea and the Ravenna Cosmographer, and identifies them, as far as possible, with the modern names.

The publisher has brought out the book in excellent style.

Kimbundu Grammar. Grammatica Elementar do Kimbundu ou Lingua de Angola por Héli Chatelain. (from the Author.)

Genebra, 1888-89,

Mr. Chatelain is a native of Switzerland, a missionary and a trained scholar, who visited Angola in 1884, and acquired the language. His grammar is designed for the use of the natives and of missionaries in West Africa, and is, therefore, written in Portuguese; but most of the words and phrases are also explained in English.

Mr. Robert Cust, who speaks with authority on the languages of Africa, writes a brief introduction to the *Grammatica*. He shows the importance of the Bunda, or Ki-Mbundu, tongue by describing it as the *lingua franca* of Western South Africa; and he expresses the highest regard for Mr. Chatelain's work as a teacher, and for his character as a missionary of a singularly devoted and self-denying spirit.

Nouveau Dictionnaire de Géographie Universelle.

The fourth volume, now well advanced, of this great work, in which M. Vivien de Saint-Martin has had the able assistance of M. Louis Rousselet, shows no diminution in the qualities that have marked it from the beginning. It is the misfortune of encyclopædias and of dictionaries that they are part of the human history, which moves straight forward on a continuous line, without regard to arbitrary limits, so that, as M. Renan has said, all history must be rewritten every hundred years. The term allowed to an encyclopædia, even of a special branch, is yet more brief; but for the thoroughness of its treatment and the accuracy and the care with which its statistical information is brought together, the *Nouveau Dictionnaire* keeps and deserves a foremost place among geographical works.

La Tunisie, Géographie, Événements de 1881, Organisation Politique et Administrative, Organisation Judiciaire, Instruction Publique, Finances, Armée, Commerce, Industrie, Travaux Publics, Système Monétaire, Par Amédée Rivière. Préface par M. Albert Mailhe.

Paris, 1887.

This is the comprehensive title of a book which contains 150 12mo. pages, including the preface. In this, M. Mailhe allows his regard for the author to carry him a little too far, when he affirms that this precious work leaves nothing to be told concerning Tunisia and its people. A similar claim is made by every enterprising publisher of an encyclopædia; and *La Tunisie* has the merits and the defects of an article written for such a publisher. A few of the subjects are treated at length,

other are briefly dismissed, and some that should appear are omitted. There is, for instance, not a word on the ethnography of the country.

No fault could have been found with M. Rivière if he had said nothing about the steps which led to the occupation of Tunisia by the French ; but he has chosen to tell the story with so many suppressions that his readers cannot go with him.

TITLES OF PAPERS IN GEOGRAPHICAL JOURNALS.

AMSTERDAM.—*Kon. Nederlandsch Aardrijkskundig Genootschap, Tijdschrift.*

An answer to Dr. J. Lorie, by K. Martin—Some Geological Observations in the Neighborhood of Baarn—Schokland (island in the Zuyder Zee)—The Talaut Islands (a group N. E. of Celebes)—Flores—Communications respecting the Hemenway Expedition, (by Dr. H. F. C. Ten Kate, Jr.,)—The Argentine Republic in its Relations to Commerce and Emigration—The Influence of Forests on the Rivers of Middle Europe.

BERLIN.—*Gesellschaft für Erdkunde, Verhandlungen.*

The German Protectorate in South-western Africa—The Final Results of the Investigation of the Krakatoa Phenomena—Dr. Hettner's Second Report on his Travels in Peru and Bolivia—On the Origin of the name "America."

Deutsche Kolonialzeitung.

African Soil and Land (by P. Reichardt)—A Visit to Hendrik Wittboy, the Hottentot Messiah, in the Summer of 1888—Prof. Sering on Col-

onization and the German Element in North America—Lake Nyassa—The Arabs in Central Africa—A German Protest against Slavery 200 years ago—The White Book on Samoa—African Land and Soil (by A. Merensky)—Bagamoyo—The Latest Regulations of Brazilian Immigration-Policy—A New “South-African Committee,” and the Feeling at the Cape (by Karl Blind)—The German in Kaiser Wilhelmsland in his attitude towards the Natives—Propositions for a practical Colonizing Occupancy of East African Possessions—The Situation on Lake Nyassa—What is to become of the Freed Slaves—A German Settlement on the Orange River—Matabele Land and the Boer Free State—The Control of the German Emigration—Colonization in the Grand Style—Stanley's Expedition—Otyimbingue (Damara Land)—The Italians in Somali Land—What does the Koran say of Slave-hunting and Slavery?—The First Travels of Europeans in our South-west-African Protectorate—The Commerce of the Congo State and the Congo Railway.

BRUSSELS.—*Société Royale Belge de Géographie, Bulletin.*

The Exploration of the Ubangi-Dua-Koyu (by Capt. Vangèle)—From Tiflis to Samarcand (by Jules Leclercq).

Le Mouvement Géographique.

The Origin of the name “America”—Lake Shambara and the Uma River—Events at Zanzibar—Exploration of the Kasaï and its Affluents

by the steamer "Roi des Belges"—Stanley to the Rescue of Emin Pasha—The Lomami : a newly discovered Water-way bringing steamers within three days of Nyangwé—The Muta-Nzige Problem—The Sources of the Nile—The Congo Railway.

BUDAPEST.—*Société Hongroise de Géographie, Bulletin.*

John Hunfalvy (founder of the Society)—Hungarian Women known as Travellers.

EDINBURGH.—*The Scottish Geographical Magazine.*

Islands of Melanesia—Dr. Livingstone and Lake Bangweolo—On the Earthquake Shocks Experienced in the Edinburgh district on Friday, January 18, 1889—Explorations in the Atlas Mountains—Lapland and Siberia by way of the Arctic Sea—The Eskimo Tribes—Leadville, Colorado—Letter from Mr. H. M. Stanley to the Royal Scottish Geographical Society—Samoa—The Portuguese in Nyassa-Land.

GOTHA.—*Petermanns Mittheilungen.*

The Ethnographic Relations of Macedonia and Old Servia—My Ascent of Kilimanjaro (Otto F. Ehlers)—The Soil of German East Africa—The South-west-African Protectorate—The New Map of Africa on a Scale of 1/10,000,000 (Stieler's)—The Latest Danish Explorations in Greenland—Geographical View of the Flora of Schleswig-Holstein—The Region at the Source of the Eastern Arm of the Tigris.

LÖCSE (HUNGARY).—*Ungarischen Karpathen-Vereines, Jahrbuch des.*

A Winter Tour in the Tatra Range (Western

Carpathians)—An Alpine Village in the Upper Tatra—Prehistoric Spots in the County of Liptau—Art-Monuments of the Middle Ages in Lőcse—Travels in the Carpathians by Land and Water—Excursions in the Tatra Range of Liptau and Galicia.

LONDON.—*The Royal Geographical Society, Proceedings.*

The Gran Chaco and its Rivers—Explorations in the Glacier Regions of the Selkirk Range, British Columbia, in 1888—Explorations on the Chindwin River, Upper Burma—Letters from Mr. F. C. Selous on his Journeys to the Kafukwe River and on the Upper Zambesi—Formosa: Characteristic Traits of the Island and its Aboriginal Inhabitants—Letter from Mr. H. M. Stanley, on his Journey from Yambuya Camp to the Albert Nyanza—The Transcaspian Railway—The River Antanambalana, Madagascar.

NATURE.

Structure, Origin and Distribution of Coral Reefs and Islands—The Gradual Rising of the Land in Sweden (Nordenskiöld)—The New Traveler's Guide to Scientific Inquiry—The Geographical Results of Mr. Stanley's Expedition—The Surface of the Earth—Notes on Stanley's Journey—Further Notes on the Geology of the Eastern Coast of China and the adjacent Islands—Rain Clouds on Lake Titicaca.

MADRID.—*Revista de Geografía Comercial.*

Spanish Commerce with Morocco—Render unto Cæsar that which is Cæsar's—The Philippine

Islands, as seen by a Foreign Writer (Blumentritt)—The Province of Pontevedra.

MILAN.—*L'Esplorazione Commerciale*.

Massowah as a Colony—Military Operations against the Abyssinians and our Colonial Native Troops—Atlantis (suggested by Joaquin Costa's study in the *Revista de Geografia Comercial*, of Madrid, 1886)—Laos and Camille Gauthier's Exploration—African Notes—Correspondence from Tripoli—Letters from Harrar.

NAPLES.—*Società Africana d'Italia, Bollettino*.

Harrar—An Expedition to Eastern Africa—A Reconnaissance in Keren—Western Africa—Capt. Wissmann in the Reichstag—From the Bight of Biafra—From Saati to Metemma—The Senusi in History and Geography—Mozambique, Delagoa Bay and Natal—Slavery and the Congo State.

NEUCHÂTEL.—*Société Neuchâteloise de Géographie, Bulletin*.

Downs, and their Formation—Maria Island (E. coast of Tasmania, near Darlington)—The Somali—Travels among the Bogos and in Northern Abyssinia—The Old Roads and the Old People of Val-de-Travers (in the Swiss Jura)—The Seventh Congress of the Swiss Geographical Societies.

NEW YORK.—*Science*.

An Agricultural Map of North America—Resources of the Nyassa Region—The Adirondack Forests—West Indian Hurricanes—Stanley's Let-

ter—Exploration in Mexico—Railways in China—The Explorations of Capt. Binger (in the French Sudan).

PARIS.—*Société de Géographie, Compte Rendu.*

The Oases in the Southern Part of Tunisia—The Application of Photography to Geography—The City of Sobral (province of Ceará, Brazil)—Memoirs of the Topographical Section of the Russian General Staff—Map of the Pamir—Russian Geographical Expeditions—Oceanography—Geography in Russia—Borings for Artesian Wells in the Sahara—The French Sudan—Taupin's Exploration in Laos—Cambodia—The M'Zab and the Beni M'Zab (in the Algerian Sahara).

RIO DE JANEIRO.—*Revista do Observatorio.*

The Origin of Meteorites—Climatological Review of the Month of January, 1889—Aspect of the Heavens during March and April, 1889.

ROME.—*Società Geografica Italiana, Bollettino.*

The Teleki Expedition—Researches in the Archives of Savona—The Earthquake in Liguria in 1887—Memorial Notice of Cesare Correnti—Physical and Social Conditions of Paraguay—A Skull from Somali Land—A Bushman Picture—The Rio Branco (or Parima) Brazil—A Pilgrimage from Bordeaux to Jerusalem (following the Bordeaux Pilgrim, A. D. 333)—The New Course of Historical Geography—On Some Cities of Spain and Portugal.

TURIN.—*Cosmos.*

Notes of a Journey from Shoa to Assab—Progress

of British New Guinea in 1887, from the Official Report of the Special Commissioner—The Aru Islands (80 m. South-west of New Guinea) and the Maclay Coast, in German New Guinea.

VIENNA.—*Kais. Königl. Geographischen Gesellschaft, Mittheilungen der.*

Death of the Crown-Prince, the Archduke Rudolf—On Determinations of Gravity—Travels in German East Africa—Statistics of the Italian Colonies in Rio Grande do Sul (Brazil)—The Subterranean Streams of Inner Carniola—The Rudolf-Grotto in Küstenland (the Adriatic Coast and Islands)—The Nicobar Islands and their People—Two Maps of the Surface-Level of France.

Deutsche Rundschau für Geographie und Statistik.

A Critical Excursion in the Doctrine of the Four World-Periods of Indian Brahmanism—Maghreb, the Land of the Setting Sun—A Visit to Corea—The Scientific Bases of Business Geography—From Leh in Ladak to the Pangong Lake (Tibet)—The Mammoth Cave—Virchow's Investigations concerning the Anthropology and Early History of Egypt—The Eruption of Krakatau and the Cloud-Glows—The Aschinof Expedition—Prjevalsky—Travels in the Crimea—The Kerguelen Islands—Stanley's March to Emin Pasha.

WASHINGTON LETTER.

WASHINGTON, JUNE 15, 1889.

TOPOGRAPHIC MAP OF THE UNITED STATES.—Considerable progress has been made in the construction of the topographic map of the United States by the Geological Survey under the direction of Major Powell. Surveys have been completed in Massachusetts, Rhode Island and New Jersey, and partially made in Pennsylvania, New York, Connecticut, Maine and New Hampshire. The maps of the first three named States are partly engraved; that of Massachusetts will comprise fifty sheets, that of Rhode Island fifteen, and the New Jersey map about fifty. The sheets measure thirteen by seventeen and one-half inches. The scale is one mile to the inch. It is proper to add that the expense of the surveys in these three States has been borne equally by the States and the United States.

The law establishing the Geological Survey of the United States authorized and directed the construction of a geological map, but made no special provision for a topographic survey. The inception of this great work therefore grew out of the necessities of the Geological Survey for geographic maps as a basis for geologic cartography, and since the commencement of the operations of the Survey, or, for the past ten years, a portion of the annual appropriations has been expended in making geographic surveys. In the law passed at the last session of Congress making appropriations for

the expenses of the geological survey, the topographic survey is for the first time distinctly and separately recognized, viz. : "For topographic surveys in various portions of the United States . . . two hundred thousand dollars," being double the amount appropriated by the same act for geologic surveys.

The atlas of the whole country will comprise about 2600 sheets, of the dimensions already described. Maps of most of the northeastern portion of the country will be made on the scale of one mile to the inch, and engraved on sixteen sheets to a square degree ; the central and southern portions and Pacific slope on a scale of two miles to the inch, and four sheets to a square degree ; the thinly settled regions of the Great Basin, the Rocky Mountains, the high Sierras and the plateau country drained by the Colorado River on a scale of four miles to the inch, and one sheet to a square degree. The square degree is one degree in latitude by one degree in longitude:

The sheets are engraved on copper, three plates being required for each. On the first is engraved the hydrography, that is to say, coast lines, lakes, ponds, rivers, and on large scale sheets all springs and running streams. PRINTED IN BLUE. On the second plate the hypsography—the relief of the surface. The method of contours or grade curves has been adopted as best representing this condition of the earth's surface. The contour interval ranges from ten feet in level country and upon maps of the larger scales to two hundred and fifty feet in the smallest scale maps. PRINTED IN BROWN. On the third plate are engraved the projection lines, lettering, public culture, legend, title, etc. By "public

culture" are meant those features of the surface of the earth due to the activity of communities, such as civil divisions, railways, canals, public works, etc., as distinguished from boundaries of estates, private roads, single houses, etc., which constitute private culture. PRINTED IN BLACK.

ALASKA BOUNDARY.—In the treaty of 1867, ceding the Russian possessions in North America to the United States, the eastern limit of the territory is declared to be "the line of demarcation between the Russian and British possessions in North America, as established by the convention between Russia and Great Britain of February 28, 1825," and described in articles iii. and iv. of said convention in the following terms ;

III. The line of demarcation between the possessions of the high contracting parties upon the coast of the continent and the islands of America to the northwest shall be drawn in the following manner : Commencing from the southernmost point of the island called Prince of Wales Island, which point lies in the parallel of $54^{\circ} 40'$ north latitude and between the 131st and 133d degree of west longitude (meridian of Greenwich), the said line shall ascend to the north along the channel called Portland Channel, as far as the point of the continent where it strikes the 56th degree of north latitude ; from this last mentioned point the line of demarcation shall follow the summit of the mountains situated parallel to the coast, as far as the point of intersection of the 141st degree of west longitude ; and, finally, from the said

point of intersection, the said meridian line of the 141st degree, in its prolongation as far as the frozen ocean, shall form the limit between the Russian and British possessions on the Continent of America to the northwest.

IV. With reference to the line of demarcation laid down in the preceding article, it is understood :
1st. That the island called Prince of Wales Island shall belong wholly to Russia. 2d. That wherever the summit of the mountains which extend in a direction parallel to the coast, from the 56th degree of north latitude to the point of intersection of the 141st degree of west longitude, shall prove to be at the distance of more than ten marine leagues from the ocean, the limit between the British possessions and the line of coast which is to belong to Russia, as above mentioned, shall be formed by a line parallel to the windings of the coast, and which shall never exceed the distance of ten marine leagues therefrom.

It is admitted that the language of the treaty, in so far as it attempts to define the boundary of the southeastern portion of Alaska territory—the valuable part of that region, then Russian America—is, from the modern standpoint, not precise enough to render misunderstanding impossible. The boundary specified was formulated on a mistaken assumption as to facts, and is impossible to determine by survey.

It was during the sessions of the Fisheries Conference in Washington in 1887-'88, that it was suggested that an informal consultation between some person in this country possessing knowledge of the questions in dispute, and a Canadian similarly equipped, might tend

to facilitate the discovery of a basis of agreement between the United States and Great Britain upon which a practical boundary line could be established. To this intent Mr. William H. Dall, of Washington, and Dr. George M. Dawson, of Canada, submitted to the late Secretary of State the results of several conferences held at the instigation of the Department.

The opinion of Mr. Dall, which to this extent is concurred in by Mr. Dawson, is, that a point be determined on each of the four passage-ways into the interior—Chilkoot, Taku and Stikine Rivers and Portland Canal—at ten marine leagues distance from the coast. Let the territory drained by branches coming into the rivers seaward by this point (to be shown by a permanent monument) belong to the United States; that drained by streams coming in eastward of the monument, to be British. The boundary would follow the water parting between the two.

At Portland Inlet and at the head of Lynn Canal the divide between the interior and coast water-sheds should form the line. Provided that in the event of the boundary line reaching a certain specified distance from the coast, it shall then follow a straight line with a prescribed course for such distance as the seaward streams may be found to lie on the British side of said line. This would reduce the positions requiring careful astronomical determinations to three, namely, the inception of the boundary line at the head of Portland Inlet and the two monuments on the Taku and the Stikine respectively. The strip of country between the 141st meridian and the head of the Chilkat River, which is inaccessible from the coast except by way of the Atna

and Chilkat Rivers, might be settled by taking the summit of the St. Elias Alps (everywhere visible from the ocean, though not yet reached or scaled by any man) which could be united by a set of great triangles from the head of the Chilkat and along the coast of the Pacific from Fairweather Peak to Mount St. Elias.

Meanwhile the Superintendent of the United States Coast and Geodetic Survey has selected Mr. J. E. McGrath, sub-assistant, as chief of a party to make a preliminary survey of the frontier line between Alaska and British Columbia along the 141st meridian of west longitude at or near where it crosses the Yukon River. The survey is made at the original instance of the Department of State, and the data and maps resulting from it are designed to be used by the Government in negotiation, adjustment and definite settlement and location of the boundary, whether by correspondence, commission or other agency. The general character of the survey is indicated in the following: "A plan or project for accurately and permanently locating in latitude and longitude points in Southeastern Alaska for the determination of a line not to exceed the distance of ten marine leagues from the coast-line, said points to be accessible respectively by the Portland Canal, the Stikine River, the Taku River and the Chilkat and Chilkoot Rivers, with such other points as may be found to be accessible by the Coast Survey parties in Southeastern Alaska; and also points on the Yukon and Porcupine Rivers at or near the 141st meridian of west longitude and such other accessible points along or near said meridian, as it may be deemed by the Superintendent of the Coast and Geodetic Survey, advisable to so

locate ; such points to be marked by such permanent marks or monuments as may be available ; and that in the vicinity of such points such rapid topographical reconnaissance or work shall be done as may be practicable and as may serve to identify and reasonably delineate the characteristics of the country, so as to enable a boundary commission or other negotiators of a boundary treaty to agree upon a boundary of straight or other intelligible and easily-defined lines. The results of the field-work thus outlined to be reduced and made available for use in the definition and adjustment of the boundary, by publication in proper and convenient map or maps, supplemented by such report by the Superintendent of the Coast and Geodetic Survey as may be necessary to explain any points not rendered clearly apparent by such map or maps."

The surveying parties for the Yukon and Porcupine Rivers were expected to embark early in June from San Francisco, in vessels provided by the Alaska Commercial Company, under an agreement to transport the parties and outfit by the way of St. Michaels and the Yukon River, to the vicinity of Belle Isle or Forty Mile Creek, and near the crossing of the Yukon River by the 141st meridian, or as near to it as they can possibly get with their steamers.

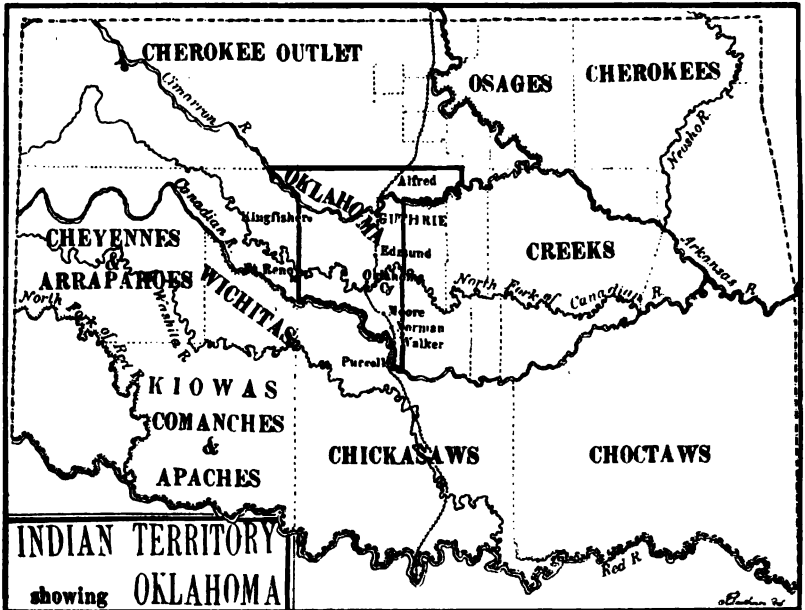
In his instructions Chief McGrath is advised that "Next in importance to the establishment of the points where the 141st meridian passes the watercourses, is the desirability of collecting as much geographical and other information as possible concerning the region. Outside of the establishment of points on Yukon and Porcupine gather information as far as possible in a

practical form, and make notes and observations copious, bearing always in mind that one object of the expedition will be to verify and correct our present knowledge of the geography of Alaska as far as it can be done without interfering with the primary object of the expedition for the boundary survey."

This is the present status of this matter.

OKLAHOMA.—In 1866 the Creek and Seminole Indians ceded to the United States 5,439,843 acres of their domain (equal to 8500 square miles) in the Indian Territory for the purpose of enabling the Government to locate thereon other tribes of friendly Indians. Portions of lands on the east and west sides of these cessions have been set apart for this purpose, and are now occupied by several tribes, but a large tract lying in the middle has never been so appropriated. It is this unappropriated and unoccupied land situated in the heart of the Indian Territory that has been declared to be a portion of the public domain, and opened to settlement by proclamation of the President of the United States, dated March 23d, 1889. It comprises about 1,900,000 acres—equal to an area about one-third larger than the State of Delaware. It is bounded on all sides by the Indian Territory, but its position may be defined by the Canadian River on the south; by the 98th meridian and Cimarron River on the west; by latitude $36^{\circ} 11'$ on the north; and on the east by longitude $97^{\circ} 15'$, the Cimarron River and, for a short distance, longitude $96^{\circ} 50'$. No territorial government has been provided, nor has the name Oklahoma been recognized by any statutory enactment, but only by common consent.

The Act of Congress which provides for the segregation of this domain is found in sections 12, 13, 14 and 15 of An Act making appropriations for the current



and contingent expenses of the Indian Department, and for fulfilling treaty stipulations with various Indian tribes for the year ending June 30, 1890. Approved March 2, 1889, As follows :

SEC. 12. That the sum of one million nine hundred and twelve thousand nine hundred and forty-two dollars and two cents be, and the same hereby is, appropriated, out of any money in the Treasury not otherwise appropriated, to pay in full the Seminole Nation of Indians for all the right, title, interest, and claim which said nation of Indians may have in and to certain lands ceded by article three of the treaty between the United States and said nation of Indians, which was concluded June fourteenth, eighteen hundred and sixty-six, and proclaimed August sixteenth, eighteen hundred and sixty-six, and which land was then estimated to contain two million one hundred and sixty-nine thou-

sand and eighty acres, but which is now, after survey, ascertained to contain two million thirty-seven thousand four hundred and fourteen and sixty-two hundredths acres, said sum of money to be paid as follows : One million five hundred thousand dollars to remain in the Treasury of the United States to the credit of said nation of Indians and to bear interest at the rate of five per centum per annum from July first, eighteen hundred and eighty-nine, said interest to be paid semi-annually to the treasurer of said nation, and the sum of four hundred and twelve thousand nine hundred and forty-two dollars and twenty cents, to be paid to such person or persons as shall be duly authorized by the laws of said nation to receive the same, at such times and in such sums as shall be directed and required by the legislative authority of said nation, to be immediately available ; this appropriation to become operative upon the execution by the duly appointed delegates of said nation, specially empowered so to do, of a release and conveyance to the United States of all the right, title, interest, and claim of said nation of Indians in and to said lands, in manner and form satisfactory to the President of the United States, and said release and conveyance, when fully executed and delivered, shall operate to extinguish all claims of every kind and character of said Seminole Nation of Indians in and to the tract of country to which said release and conveyance shall apply, but such release, conveyance, and extinguishment shall not inure to the benefit of or cause to vest in any railroad company any right, title, or interest whatever in or to any of said lands, and all laws and parts of laws so far as they conflict with the foregoing, are hereby repealed, and all grants or pretended grants of said lands or any interest or right therein now existing in or on behalf of any railroad company, except rights of way and depot grounds, are hereby declared to be forever forfeited for breach of condition.

SEC. 13. That the lands acquired by the United States under said agreement shall be a part of the public domain, to be disposed of only as herein provided, and sections sixteen and thirty-six of each township, whether surveyed or unsurveyed, are hereby reserved for the use and benefit of the public schools, to be established within the limits of said lands under such conditions and regulations as may be hereafter enacted by Congress.

That the lands acquired by the conveyance from the Seminole Indians hereunder, except the sixteenth and thirty-sixth sections, shall be disposed of to actual settlers under the homestead laws only, except as herein otherwise provided (except that section two thousand three hundred and one of the Revised Statutes shall not apply) : *And provided further*, That any person who having attempted to, but for any cause,

failed to secure a title in fee to a homestead under existing law, or who made entry under what is known as the commuted provision of the homestead law, shall be qualified to make a homestead entry upon said lands: *And provided further*, That the rights of honorably discharged Union soldiers and sailors in the late civil war, as defined and described in sections twenty-three hundred and four and twenty-three hundred and five of the Revised Statutes shall not be abridged: *And provided further*, That each entry shall be in square form as nearly as practicable and no person be permitted to enter more than one-quarter section thereof, but until said lands are opened for settlement by proclamation of the President, no person shall be permitted to enter upon and occupy the same, and no person violating this provision shall ever be permitted to enter any of said lands or acquire any right thereto.

The Secretary of the Interior may, after said proclamation and not before, permit entry of said lands for town-sites, under sections twenty-three hundred and eighty-seven and twenty-three hundred and eighty-eight of the Revised Statutes, but no such entry shall embrace more than one-half section of land.

That all the foregoing provisions with reference to lands to be acquired from the Seminole Indians including the provisions pertaining to forfeiture shall apply to and regulate the disposal of the land acquired from the Muscogee or Creek Indians by articles of cession and agreement made and concluded at the city of Washington on the nineteenth day of January in the year of our Lord eighteen hundred and eighty-nine.

SEC. 14. The President is hereby authorized to appoint three commissioners, not more than two of whom shall be members of the same political party, to negotiate with the Cherokee Indians and with all other Indians owning or claiming lands lying west of the ninety-sixth degree of longitude in the Indian Territory for the cession to the United States of all their title, claim, or interest of every kind or character in and to said lands, and any and all agreements resulting from such negotiations shall be reported to the President and by him to Congress at its next session and to the council or councils of the nation or nations, tribe or tribes, agreeing to the same, for ratification, and for this purpose the sum of twenty-five thousand dollars, or so much thereof as may be necessary, is hereby appropriated, to be immediately available: *Provided*, That said Commission is further authorized to submit to the Cherokee nation the proposition that said nation shall cede to the United States in the manner and with the effect aforesaid, all the rights of said nation in said lands upon the same terms as to payment as is provided in the agreement made with the Creek Indians of date January nineteenth,

eighteen hundred and eighty-nine, and ratified by the present Congress ; and if said Cherokee nation shall accept and by act of its legislative authority duly passed, ratify the same, the said lands shall thereupon become a part of the public domain for the purpose of such disposition as is herein provided, and the President is authorized as soon thereafter as he may deem advisable, by proclamation to open said lands to settlement in the same manner and to the same effect, as in this act provided concerning the lands acquired from said Creek Indians, but until said lands are opened for settlement by proclamation of the President, no person shall be permitted to enter upon and occupy the same, and no person violating this provision shall be permitted to enter any of said lands or acquire any right thereto.

SEC. 15. That the President may whenever he deems it necessary create not to exceed two land districts embracing the lands which he may open to settlement by proclamation as hereinbefore provided, and he is empowered to locate land offices for the same appointing thereto in conformity to existing laws registers and receivers and for the purpose of carrying out this provision five thousand dollars or so much thereof as may be necessary is hereby appropriated.

The country is described in general terms as a vast plain with gradual slopes towards the East, and is drained by the Cimarron and Canadian Rivers, which traverse the territory from the West to the East. The temperature averages from 50° to 60°, atmosphere dry, altitude about 1000 feet. The land is good, said to surpass that of the States : timber abundant. A division of the Atchison, Topeka and Santa Fé Railroad runs through the whole length of the territory, a little eastward of a line drawn through the centre.

The bill to provide for the organization of the Territory of Oklahoma (known as the Springer bill) which failed to pass both houses of Congress at the last session, carved out a territory of much larger extent, to wit : all that part of the Indian Territory west of the lands occupied by the five civilized tribes (the Cherokee, Creek, Seminole, Choctaw and Chickasaw), and also what is

known as the Public Land Strip, lying north of Texas, east of New Mexico, south of Colorado and Kansas, and west of the Indian Territory. The land embraced within its limits contains 23,267,719 acres, an area equal to that of the State of Indiana. This bill was abandoned chiefly for the reason that the grotesque clamor for Oklahoma lands precluded the possibility of allowing sufficient time for further negotiations with the Indian tribes, in order to arrange for compensation for diversion of the lands from the purposes set forth in the treaty of 1866, and to settle conditions of removal of the tribes already located; for, as has been already observed, the Cherokees and Seminoles ceded these lands to the United States by treaty in 1866 for the declared purpose, *and for no other* than that of settling thereon friendly Indians and freedmen. The substitute measure agreed upon late in the session and made part of the Indian Appropriation bill was considered the most effectual disposition of the question for the present. But nothing is more certain than that, in the near future the larger area will be included, the Indians removed, and a territorial government provided.*

PARAGUAY.—The latest official accounts† from Paraguay amplify, to a considerable extent, our previous knowledge of that interesting country. The northwest boundary of the western division, or the Gran Chaco,

* There can be but one opinion concerning the action of Congress; and if anything could add to its iniquitous character it would be the fact that the spoliation was planned in full view of the preparations for celebrating, as a national solemnity, the hundredth anniversary of Washington's inauguration as the first President of the Republic.

GER. C. HURLBUT.

† F. D. Hill to the Department of State. Dated, Asuncion January 23, 1889

as it is called, which is a vast and unexplored country, is still undetermined, the Bolivians and Paraguayans disputing the proper location of the line. Until recently the Chaco has been considered to be an uninhabitable waste, but within the last two years the lands have risen enormously in value. A concession has been granted to a company of capitalists for the construction of a railway from Asuncion through the Chaco to Sucre, Bolivia, a distance of 600 miles. With this opening of the Chaco to settlement it is not improbable that the part of Paraguay west of the river may in future years prove to be the better part of the country.

Contrary to the opinion which has prevailed in the United States and elsewhere, the climate of Paraguay is declared to be remarkable for its salubrity. Dr. Stewart, British Vice-consul at Asuncion, says: "If the absence of the principal zymotic diseases—yellow fever, typhus and typhoid, cholera and dysentery, which are all more or less endemic, or appear epidemically in Brazil and in the River Plate—has any relation to climate, then that of Paraguay is very highly favored, those diseases being almost unknown here." The range of temperature during 1886 was 99° in January to 45° in June, and in 1888 the thermometer reached a maximum of 97° on six different days.

In the matter of population it has been said that seven-eighths of the inhabitants, or 700,000 out of 800,000 perished during the war of 1865–1870. The present number of inhabitants may be set down at about 300,000. Asuncion has a population of 25,000. It supports five daily morning papers which, however, appear on the previous evening. The whole country has

eight hundred and forty-one business houses, owned mostly by foreigners ; but there is not a British house among them. Four hundred and fifty new houses were erected in 1886, and more in 1887. Ordinary houses rent for \$100 per month.

The illiteracy of the people is frightful, only about fifteen per cent. being able to read and write. But to-day education is compulsory in all parts of the Republic. There are now one hundred and thirty-eight schools, with an enrolment of 15,180 scholars ; and a normal school training system has been established under an energetic teacher from the United States.

In 1877 the sum of \$158,459 was expended by the Government for purposes of education, and by a law passed the same year the following sums are devoted to the same purpose : (1) the sum voted in the general tax ; (2) ten per cent. of the product of the public lands and *yerbales* (plantations of maté) ; (3) an additional three per cent. as soon as the amortization of the interest debt is complete ; (4) the fines in general ; (5) the product of vacant inheritances, successions, etc. ; (6) one-half the proceeds of judicial sales ; (7) a tax of one dollar upon each male over twenty-two years of age domiciled in the Republic. A national college is located at Asuncion.

The home debt of the Republic on the first of January 1888, was \$1,068,891, and the foreign debt was \$14,952,097. But of the latter sum \$12,945,334, being claims of the Argentine Republic and Brazil, will probably never be paid. The growth of the revenues since the close of the war has been from \$102,000 in 1870 to

\$3,056,093 in 1887. The total expenditure in 1887, was \$1,400,503, including interest.

The value of imports and exports (about equally divided) for 1887 was \$4,447,726, an increase over 1886 of \$1,184,215. Forty-eight per cent. of the imports came from Great Britain. With the exception of a few agricultural implements and a little lumber, none of the imports came from the United States, the American flag being substantially unknown in that part of the world.

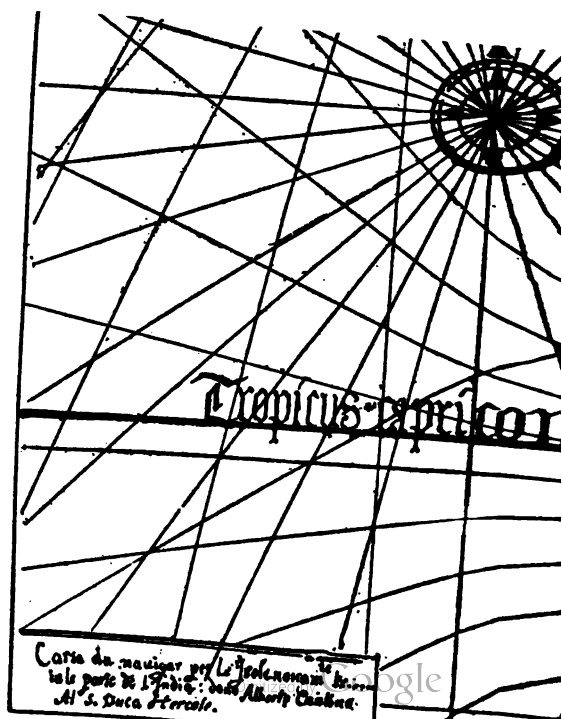
The railroad from Asuncion to Paraguari, commenced in 1861, and the first line constructed in South America, will be completed to Villa Rica this year. The number of passengers carried last year was 257,688. In 1881 the total number was 81,807. The revenue from the post-office has increased from \$1,872 in 1880 to \$12,257 in 1887. There are two lines of telegraph, both under government control, one of them connecting Asuncion with the outer world. The service is said to be poor. Two new lines are about being constructed. Five years ago there were no banks. To-day there are five, all located in Asuncion. They issue circulating notes, which constitute the chief currency of the country.

The tide of immigration is beginning to set in towards Paraguay with considerable force. At present there are three colonies. That of San Bernardino on the border of Lake Ipacanai numbers about six hundred inhabitants, mostly German. It has about nine hundred acres in cultivation. That at Villa Hayes (named in compliment to President Hayes) on the Paraguay, numbers about four hundred inhabitants, mostly French. It has about three hundred and twenty-eight acres in cultivation. The Nueva Germania colony is on the Aguarray-

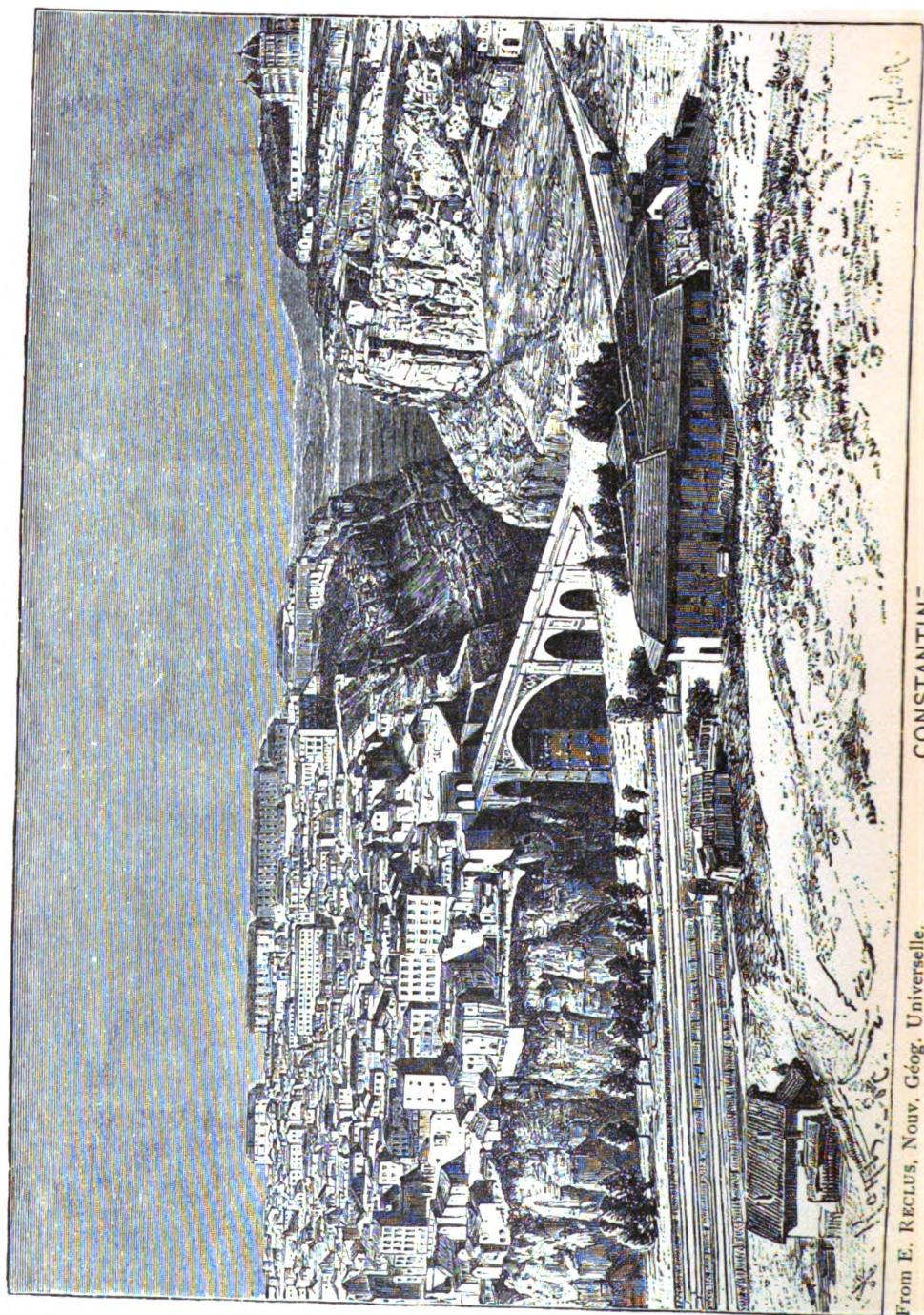
Guazú, a navigable affluent of the Jejuy River. It numbers about one hundred, mostly German. It is the newest of the colonies and possesses twelve leagues of land. The immigration laws are liberal, probably too liberal to enable the Government to fulfil its pledges and promises, should immigration set in to any considerable extent. Good land can be bought for \$1.25 per acre.

The number of cattle has increased over six hundred thousand in ten years, but little or no attention is paid to cultivating breeds. The value of exported tobacco has increased in five years from \$286,759 to \$582,408. Sugar-cane is grown in all parts of the country, and cotton grows spontaneously. There is no intelligent fruit culture, but every town is buried in the luxuriant foliage of orange groves. The fruit, which is of large size and rich flavor, matures in April, and is delivered on board the boats at \$3.50 for 5000.

Attention has been drawn to the resources and natural advantages of this country by means of its display at the Barcelona and Paris Exhibitions. As Mr. Hill remarks, the upward movement in Chili, Peru, the Argentine Republic and other South American countries is due to foreigners, and the future of Paraguay lies in its ability to attract immigration to its fertile lands, and to induce foreigners to make their permanent homes within its borders.







From E. RECLUS, Nouv. Géog. Universelle.

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A LOOK AT ALGERIA AND TUNIS.

BY

FREDERICK A. OBER.

To open this paper with a confession:—I went to Algeria for a stepping-stone to Spain, to trace the progress of Arab civilization, or rather the progression of that flood of Arabians that overflowed Egypt and North Africa and thence all Spain, to and beyond the Pyrenees a thousand years ago.

In the following sequence, somewhat we may trace it: Damascus, Cairo, Carthage, Algeria, Tangier, Andaluz. And in Andaluz in Southern Spain, do we not find Granada, Seville, Cordova, Cadiz, Palos? Cadiz and Palos, whence Columbus sailed to America.

Africa and Spain, then, do they not furnish us with the prefatory pages of America's history?

No, I do not deny the Norsemen anything; I say merely, it is a feeble glimmer the North Star gives us, as compared with the steady ray from the Star of the East.

I woke one morning in Algiers. It was a bright cool and windy morning, that of the twentieth of March.

Though early, a large proportion of the population seemed to be astir, and I had company everywhere, yet not an obtrusive company. The population of Algiers, Arab, Moor, Nubian, French, etc., is thoroughly cosmopolitan ; it manifests no surprise at anything, and this, I take it, is owing to its own heterogeneity, for there never was, certainly, anything more unique than itself. In one word : as to situation, as to composition, as to surroundings, Algiers is most beautiful. Its beauty is of the Oriental type, with an intrusion from France. The French structures, which are mainly along the quays and in the lower part of the town, are of themselves fine and even grand, but they spoil the picture of Algiers from the sea by breaking the continuity of the converging lines that lead up the hill-side from the water edge. In general outline this city is an isosceles triangle resting against a background of red and verdure-clad hills. Not inaptly, the ancient Arabs compared it to a diamond with an emerald setting. A milky opal it seemed to me, with its iridescence clouded over, for the walls and roof are creamy hued, and from a little distance blend most beautifully with the surroundings. The general slope of the Sahel or chain of hills behind and extending beyond the city, is toward the south and east. From the blue waters of the deep bay, the city mounts the hill in a succession of terraces line above line, the modern French houses near the water line, the true Arab city higher up, and the apex of the pyramid crowned by the Kasba or ancient citadel of the Beys, some 400 feet above the quays. Since the French occupation, now some fifty years past, the modern buildings above the entire waterfront have been erected. The most magnificent work

here seems to be along the quays, a series of arches rising some forty feet above the water line, in two tiers, covering an area of eleven acres, with a frontage of 3700 feet, and occupied as warehouses and storage-rooms, some 350 in number. This great work was the achievement of Sir Morton Peto ; it cost some £300,000, and was completed about twenty years ago. This system of arches supports the grand avenue formerly called the " Boulevard de l' Impératrice " but now the " Boulevard de la République." As it overlooks the enclosed harbor, the beautiful bay and the shipping and gives glimpses of the Atlas Mountains beyond, this boulevard is the favorite promenade of an afternoon and evening, and is densely crowded. The finest buildings, six to eight stories in height, front towards this boulevard and the bay, and the best hotels are here, nearly all with a line of arcades. All the buildings of the city are of stone, massive structures, many with white or tinted walls and roofs of tiles. There is no structure in the world that lends itself so perfectly to become a component part of the landscape as the stone-walled building with roof of richly tinted tiles. I wonder why we do not use this kind more in America.

An unbroken line of fortification surrounds the city, beginning at either end of the boulevard, running up the hills behind it and crowning the crest, a high wall, loop-holed, battlemented and buttressed by occasional forts. Two great jetties sweep around from north and south and enclose a sheltered harbor, 222 acres in area, with a depth of 40 feet, and a width of entrance something over 1000 feet. The breakwater was begun in 1836, and is said to have been the first experiment in constructing

works of this kind with blocks of concrete. It was a successful experiment, and, even though some of the great blocks have been undermined and broken down, the enclosed harbor is perfectly sheltered. Beacons at either extremity, one showing a green and the other a red light, guide the mariner into the harbor at night. All this was a modern work ; but there had existed, previous to the coming of the French, a small harbor protected by a mole. This was constructed in 1518 by the first of the pirate Deys who made the name of Algiers such a terror to followers of the sea. Not only are the remains of this still seen, but even the light-house built in 1544 yet stands. It is octagonal in shape, one hundred and twenty feet high, and displays a fixed white light visible fifteen miles at sea. This light-house of the pirates is built upon the remains of a fort the Spaniards erected and held for many years, called by them Fort Peñon. The fortification, as already mentioned, begins at the breakwater on either side and entirely encloses not alone the city but the hill upon which it is built. A great wall was built from the sea to the Kasba in 1540 by one of the pashas, and in 1581 the fort at the eastern end of the Boulevard de la République, known as the Fort Bab-Azzoun. The present line of environment consists of a high rampart, parapet and ditch, with here and there bastions stretching around from sea to sea. To the north is the city gate of Bab-el Oued, to the south the gate of Bab-Azzoun.

My room at the hotel faced the the sea, and was at a height sufficient to give me glimpses of a great deal beyond the bay. Such sunrises as I saw from my little room were of the kind to live in memory forever. I

always retired with the *jalousies* drawn aside, so that the first morning beams should apprise me of the coming sun. Then I would lie against my pillows in ecstasy, watching in wonder the beginning of another day. First the mists on the Mediterranean would dissolve and roll upward, disclosing white, pointed sails against the blue, then the snow peaks of the distant Atlas became slowly tinged with pink, deepening to crimson and then glowing like burnished gold, as the great red orb lifted itself above their crests. Fleecy clouds hung about the horizon for an hour or so, then disappeared, as the sun fairly entered upon his daily journey across a cloudless sky. The noises on the quay and in the street below increased as the hours went by, dying away at noon, but swelling to a perfect uproar late in the afternoon and early in the evening. Then, from dusk till midnight, the Frenchmen are in their glory. They swarm the streets, promenade the avenue, gather in groups around the tables on the walks and squares, chatter incessantly, shout, sing, and fill the air with music. Wherever the Frenchman goes, there goes a bit of Paris. He is always aggressively happy, always seems determined that the world shall see what a blithe and light-hearted creature he can be. The grand promenade is along the Boulevard de la République, above the quays, beneath the corridors of the great hotels and around the Place du Gouvernement. These wide French streets and boulevards are the cleanest and most pleasant thoroughfares, but the narrow lanes that branch out from them and climb the hill are, by far, the dirtiest and most interesting. Such are the Rue de la Kasba, the Rues Kléber, Ben Ali, and de la Mer Rouge. In

the Rue de la Mer Rouge one may ascend by steps, 500 in number, and, of course, no carriage can enter. But the steepness and the steps offer no obstacle to the donkeys, that crowd you against the walls at unexpected corners and act as though they owned the entire alley. Cautiously threading your way along and up this tortuous street, you have glimpses of the Orient that will repay all your exertion ; of Arab dens, swarms of half-naked children, rows of Arab shoes with their heels chopped off, peeps into dimly-lighted dens, from the obscurity of which gleam out wolfishly the eyes of masculine Arabs, while a more tender light may at rare intervals gladden you from the orbs of some Moorish damsel. If we climb high enough, we shall reach certain corners where we can look back over the roofs, and out through the rift in the walls, to the shining sea beyond. Climbing yet higher, we reach the Kasba or citadel, the ancient palace of the Deys, the foundations of which were begun in 1506. It caps the summit of the hill, the apex of the shining triangle of white houses and mosques lying against the Sahel. A fine mosque and minaret stand near and ornamental tiles are yet to be seen in place, suggestive of former elegance. Here dwelt those semi-savage Turks and Moors, whose barbarities held Christendom in awe for several centuries. In the centre of the Place du Gouvernement is the fine equestrian statue of the Duke d'Orléans, and on one side a large mosque, with a square minaret, about ninety feet high, in which is a clock. A more ancient mosque, said to have been erected in the eleventh century, is the *Djamaa el Kebir*, in the Rue de la Marine, very near to the other. Its interior is like that of all mosques,

with massive columns supporting the roof upon Moorish arches. Coarse matting covers the floor and protects it from the foot of the unbeliever. You may enter any mosque in Algiers if you take off your shoes and carry them in your hands. You may keep on your hat, but you *must* take off your shoes. At the entrance to every mosque, or in the court, is a fountain where the Moslems wash their feet before entering the holy place. A few lamps are hung here, and the only other objects to attract attention are the *Mimbar*, or pulpit, and the *Mihrab*, or holy niche towards Mecca.

More than a hundred mosques are said to have stood in Algiers previous to the French invasion, but doubtless many of them were merely *koubas*, or the tombs of Arab saints. These may be seen dotting every hill crest in the country, and occupying nearly every prominent situation in Algiers. The finest is that of Sidi Abd-er-Rahman, above the garden Marengo. The saint died in 1471, and his beautiful mausoleum is hung with the richest silk drapery, banners, lamps, and ostrich eggs. The cemetery in front and around it is charming, in its quaintest tombs and headstones, where rest the ashes of many Mahometan rulers, the latest interred there being the Dey of Constantine. Below this enclosed cemetery lies an attractive spot, the garden Marengo, where many strange plants flourish, where serpentine walks lead to glorious outlooks over the sea, and where coolness and shade ever invite the traveller to rest. In its centre stands an ornamental kiosk decorated with fanciful tiles. Speaking of religious edifices, we should not neglect the French Cathedral, in the Place Malakoff, built on the site of the Mosque of

Hassan. A broad flight of twenty-three steps leads to the entrance, within the portico, with its four black-veined marble columns. More conspicuous, both from its position and its architecture, is the famous church of Our Lady of Africa—Notre Dame d'Afrique—perched upon a commanding promontory a short distance beyond the Bad el Oued, or northern gate. It is a grand structure in the Romano-Byzantine style. This may be called the church of the sailors, as here are said masses especially for those lost at sea. To the brow of the promontory, every Sunday, the clergy march in procession, and perform funeral ceremonies above the vast grave of the sea yawning at their feet. Out in this direction and above the city, the views from the hill-tops are beautiful. Leaving the city by the southern gate, at several kilometres distance we find a delightful garden of all sorts of tropical plants and trees, called the Jardin d'Essai. On the way we pass the broad parade ground where the soldiers manœuvre and where the Arabs camp with their camels.

Above this is an Arab cemetery, which is much frequented on Fridays by the Moorish women. It contains the sacred tomb or *kouba* of Sidi Mohammed Ben Abd-er-Rhaman bou Kouberain, or the man with two tombs. The most attractive district of Algiers is that beyond the Porte d'Isly, called Mustafa Supérieur, where the houses of the European residents are mostly built and where the numerous villas, many of them in Moorish style, stand among gardens. Here the summer palace of the Governor General is built, thoroughly Oriental in its architecture and tropical in its surroundings.

On my first trip to Mustafa Supérieur I met in the

omnibus the British Consul General Sir Lambert Playfair, the author of the "Guide to Algeria" and of various books on Africa and the Mediterranean. He insisted that I should go with him to his house.

Sir Lambert is a brother of Sir Lyon Playfair. He has lived twenty years and more in India and Africa, and is ever active and alert. I was much interested in some mosaics he was making with his own hand from native marbles of Algeria; and as we had common topics of interest in birds and flowers, we talked till nearly dark, and I went away with a delightful impression of British culture and hospitality. Sir Lambert declares the views from Mustafa Supérieur to be second to but one on the Mediterranean, and as I stood at his windows and in his garden, and wended my way down the winding road to the city, with views combined of land and sea, framed in tropical vegetation, I was inclined to think with him that this was one of the favored countries of the earth.

FRENCH PROGRESS IN ALGERIA.

If anything be needed to illustrate French push and progress, and their fitness for successful colonization, it is to be found in their manner of road and railway construction. The French are the Romans of to-day, in the matter of road making. From every seaport and from every important city in Algeria roads and railways ramify in every direction, and are all trending toward the great and mysterious interior region known as the Desert. But, as they push further and further southward, the Great Desert vanishes before them, and is only heard of when the locust clouds come up and the scorching siroccos

sweep along the plains. More than fifteen hundred miles of railroad are now built in Algeria, or rather along the north coast of Africa. The various lines form one vast system, so that the traveller can enter Africa at Oran and journey clear through to Tunis. And these roads are well built, stone ballasted, with massive viaducts and gentle gradients; though the rolling stock consists of those hideous cars and wagons we see in France and Spain. The distance from Oran to Algiers is 421 kilometres, and the first-class fare is 48 francs; from Algiers to Constantine, 464 kilometres; from Constantine (or Kroubs) to Tunis, 450 kilometres, the whole distance being 1335 kilometres, or about 850 miles. The various branch lines extend from near Oran to Tlemcen and to Mascara; from Phillippeville and Constantine to Batna, El Kantara and Biskra, and one projected from the Port of Bone, and the main line to the Gulf of Gabes. Nowhere in the world does it seem to me is there such a magnificent opportunity for development and civilization as in Africa, and especially in that portion now controlled by the French. The French, as colonizers, are better than the English to deal with barbarous peoples. Before the Anglo-Saxons, barbarians and semi-civilized peoples melt away like snow before the sun. With the French, however, the case is different. They never exterminate, but assimilate. They certainly have very tough subjects in the stern and sullen Arabs, who hold themselves aloof in lofty scorn of the Europeans; but the French success with the Arabs of the cities, and even with the Jews and the Berbers, is evident.

The French have moved along several lines of pro-

gression and conquest. They have steadily advanced and held everything they have gained. In going from Algiers to Constantine you have a taste of North African quality in the great variety of scene and the glimpses into history afforded by towns along the line.

Though much of the route is monotonous, yet there are grand mountains, gloomy gorges and ravines where yet lurk the lion and the panther. Such gorges are the Portes de Fer, near the station of Sidi Brahein. Many of the towns have mournful memories of the native revolt of 1871, such as that of Palestro, a village 77 kilometres from Algiers, whose population of Tyrolese, French and Spanish immigrants was massacred in a manner peculiarly atrocious. At 294 kilometres from Algiers we reach Sétif, a very ancient city and a flourishing colony in the Middle Ages.

Not far from the station of Telegma, about 40 kilometres from Constantine, the most beautiful remains of Roman art in Africa were discovered in 1878. The mosaic floors are supposed to be of the first or second century and represent domestic and hunting scenes, with great beauty and fidelity.

The objective point of this long railroad ride is the famous city of Constantine, declared to be the most picturesque, as to its natural situation, in the world. It covers the summit-platform of a rock plateau, square in shape, with perpendicular sides rising nearly 1000 feet in places above the river Rummel, which flows around it on the north and east. This river, flowing through its cañon walls, is spanned by four natural bridges of rock, one of which supports the bridge by which the city is

reached, El Kantara. Constantine, formerly Cirta, was a sister city of Carthage, and the capital of Numidia. The name was changed to Constantine, about the year 313. It is a city celebrated in ecclesiastical history, also, and connected with the great St. Augustine and the early Christian bishops of Africa. Relics of Romans, churchmen, Arabs, Vandals are found here on every side. The last of the Deys here built a magnificent palace, that the world may well come to now and gaze at in wonder. Monuments with Latin inscriptions may be found on every hand, and a Roman aqueduct, repaired, brings water to the city. From Constantine, or, rather, from the port of Philippeville north of it, a railroad passes southwardly into the desert. At present you can go no further than Biskra, 230 kilometres, whence roads or trails branch out into the unknown. From Batna, about midway, we may reach the little known Aurès Mountains, where reside people supposed to be descendants of Romans, Byzantines and Vandals, and whose women are said to be among the most beautiful in the world.

About half way between Batna and Biskra is the great gorge El Kantara, so called from a famous Roman bridge seen here. The scenery here is very picturesque, mountain and desert scenes blended, and a forest of date palms marks, it is said, the northern limit of the desert fruit. For oases, we must push on to Biskra, the terminus of the railroad projection in this direction. Biskra is a charming desert town, composed mainly of mud buildings, with a great grove near and around it. The oasis of Biskra is said to contain 100,000 palm trees, and as it is abundantly supplied with water from running streams

and artesian wells, it has smiling fields and luxuriant gardens. Its climate is tropical, except during the winter months, and the air is pure and dry. It has been a favorite subject with the French writers on Algeria. Biskra is the northernmost of that archipelago of oases that lies across the great sea of the desert. From the mountain range south of Batna you gain your first glimpses of this sea of sand, a vast plain, sweeping away and away. It is like the ocean, boundless, save for the horizon's brim ; the image of the ocean with its isles and islets. This vast plain without limit, and unsurveyed, is the Sahara, and like the ocean it is constantly encroaching upon the fertile land, sweeping its sand billows upon the foot-hills of the mountains and sending its sand-storms flying over the Tell and the Metidja, even to the Mediterranean. Storms and hurricanes sweep over this vast plain as over the ocean ; its oases are the resorts of predatory Bedouins and of caravans, even as the palm islands of the Pacific are lairs for pirates and havens of rest for storm-tossed fleets. Nothing in nature, perhaps, can present so dreary an aspect as the plains of the Sahara, except the fire-scathed crater of a volcano ; and nothing so welcome to the traveller and the caravan as the green oasis. There are three generally accepted divisions of the N. African land : First, the littoral strip of territory called Tell, consisting of fairly fertile cultivated land extending from the coasts to the mountains, and the high plateau, and varying from fifty to one hundred miles in width. The Atlas Mountains cross the territory with a general trend from north-west to south-east : from Cape Nun, on the Atlantic, to Tunis, on the Mediterranean. They approach within thirty miles of the city of Algiers, and between their lateral

ridges are fertile valleys, like the Metidja. South of the mountains and plateau begins the Sahara, which may occupy as vast a territory as the geographers will admit ; and beyond this lie the oases, the third division. In most of the oases the palm groves are planted many feet below the surface of the desert, in the water-bearing sand beneath the surface-crust of gypsum. Thus, a mound of verdure may sometimes be seen rising dome-shaped above the sands, without any visible trunks to the trees.

Twelve or fifteen miles from Biskra is Okba. Here also are beautiful oases, and here is probably the " oldest Mahometan Monument in Africa," the mosque of Sidi Okba, an Arabian warrior who is said to have conquered this country in the sixtieth year of the Hegira, and this memorial mosque is dated from early years of the eighth century. It is about one hundred feet long, this primitive building, and from its minaret is a most charming view of the surrounding country. An inscription here, in Cufic characters, is said to be " perhaps the oldest Arabian inscription in the world," and reads : " This is the tomb of Okba, son of Nafa, May God have mercy on his soul." He and some 300 of his men were massacred here by the Berbers in the year of our era 822.

Tunisia, the latest acquisition of the French in North Africa is a natural continuation of Algeria. The city of Tunis occupies a position between the lakes or lagoons, while the ancient Carthage was nearer the open gulf. Of the modern city an English artist writes : " No words can do it justice. The great bay is almost land locked ; billowy peaks to the east ; in the dim distance the blue hills of the Zaghouan range, the mountains that look down upon the far-famed city of Kair-

wan ; directly in front the white houses of the Goletta—the present harbor of Tunis ; away to the westward the stony amphitheatre, rich with the memories of 2000 years, where once stood Carthage, the very spot from which Dido looked with longing eyes upon the white sails of her hero-lover as they floated over this lonely bay. Everywhere there are fine hills in graceful outline sweeping down to the blue waters of the gulf, and everywhere strange tropical trees, lofty date palms, and straggling prickly pears. I know of no city except Constantinople that occupies a site which can be compared with this. Even that of Ephesus is inferior in splendor, if not in interest. The great city occupied an amphitheatre sloping gently down to the edge of the gulf.” Such was the situation at Carthage. “The impression to-day is one of intense disappointment. The Roman wish has been fulfilled, and of the once glorious Carthage not one stone remains standing above ground.” “The whole site of the city is strewn with broken fragments of pottery, mosaics, sculpture, marbles, pillars, tiles. Everywhere, too, huge fallen masses of masonry are lying prone upon the earth. The site of Dido’s palace is shown, and beyond the extensive cisterns, vast subterranean structures with heavy vaulted roofs. In every case the masonry is of the most substantial character, showing how well the Phœnicians did their work.”

There is here a rich field for excavation. “Three towns lie here atop each other, one Punic, one Roman, the last Byzantine.” Tunis, now the chief city of this great gulf, “grew out of the ashes of the Roman colony, and received its autonomy only with Islam. The Arabs destroyed all evidences of Christian culture, overthrew

the temples, and with their fragments built their own mosques and palaces." Though Tunis has been declared more Oriental than the Orient, than even Cairo and Damascus, yet the inter-communication afforded by the railroad has robbed it somewhat of its distinctive character. Its bazaars may be more richly furnished than those of Algiers and Tlemcen, but they are substantially the same in character.

France has not been able to give much attention to the transformation of the people here; she has had too much to do in seeking to assure peace throughout the country.

The ethnographer finds the following elements in Algeria: (1) The true Berbers, (2) Arabianized Berbers, (3) the Arabs, (4) Algerians, (5) the Jews. As to the Koulougdis, or half-breeds, children of Turks and native women, and the negroes, they are so few as scarcely to merit special mention. In round numbers, there may be 1,000,000 Berbers, 1,500,000 Arab-Berbers, 500,000 Arabs, 500,000 Europeans, including the Algerians, and 35,000 Jews. Most of the negroes from the Soudan are found in the oases.

The dark type of the primitive population greatly resembles the Arab type, their distinctive features being less accentuated in the Arab-Berbers. Among the Berbers the bones of the skull are excessively hard and thick, and the children of their own accord practise striking the hardest object with their heads. All natives wear the beard, though the head is completely shaven, with the exception of a tuft of hair on the very top. The members of certain brotherhoods often let this tuft grow until they can braid it.

It is impossible to trace, even approximately, the physical characteristics of the new Algerian race, whose existence has but just commenced. The Berbers of the mountains inhabit houses grouped together in small villages on peaks and hill-crests difficult of access. Their domestic animals live under the same roof, separated from the family by a low wall. The Berber costume consists of a long shirt, over which is the burnoose, the legs, arms and the top of the head being bare. The women's costume consists simply of a woollen, shirt-like garment, belted around the waist. A handkerchief around the head, immense ear-rings, a necklace, bracelets and anklets complete the attire. Men and women wear their clothes till they fall to pieces. There is little variety in their food, their most common dish being the *couscous*, or lumps of flour cooked with the steam from the broth of the meat, and strongly seasoned with butter or oil; add to this various fruits, such as dried grapes and figs, artichokes, beans and peas. The Arab-Berbers live sometimes in *gourbis*, or huts of branches, sometimes in tents made of camel's hair. Each hut or tent shelters an entire family. A group of huts is called a *dechera*, or hamlet; if composed of tents, it takes the name of *douar*. They wear the costume of the Berbers, and in addition, sometimes, the *haik*, a long piece of very light cloth, first wrapped around the body, then brought around the head, where it is kept in place by a camel's hair cord. On great occasions the horsemen wear riding-boots of red leather. All the Arabs live in tents, and are nomadic. Their food consists of *couscous* of wheat or barley, and the various fruits, especially dates of the desert, of which they are extremely fond,

mutton when they can get it, and milk. They are very frugal, and more temperate than other natives.

The city dwellers have adopted a more complicated costume, consisting of bulgy trousers, a broad red belt of wool or silk, a close waistcoat, and a jacket of cloth or silk. On the feet shoes without heels, or with quarters turned in; on the head two caps, one of cotton, the other of red wool, placed over the first; over the shoulders a light burnoose. The native women in the towns are often as light as European brunettes, losing the dark color they had in the country; and this change is so marked that one would be likely to consider them a separate race. They lead a more comfortable life than the country women, and even if they are deprived of the privilege of going out with uncovered faces, they find some compensation for this in dressing more coquettishly. Their costume differs from that of the men only by its elegance; the belt is more graceful, the jacket of richer material, the coarse shirt of the men is replaced by a garment of gauze, and the scanty waistcoat forms a bodice open at the throat. The *coiffure* alone is entirely different; the hair is brought to the top of the head, and around it is twisted a fringed silk handkerchief. The young girls braid their hair into one long plait and wear a sort of velvet cap adorned with sequins. Out-of-doors the women wear a little veil, which hides all the face below the eyes, while a large piece of cloth falls around the body, hiding its general shape. The most elegant houses differ little in furnishing from the tent; carpets, mats and small mattresses serve as seats during the day and as beds at night. The jewels and gala dresses are piled up in

trunks of native wood. Among the poor the meals are served on the ground ; among the rich on a copper tray placed on a very low and small table.

All eat out of the same dish ; the solid food is taken with the fingers, the liquid with wooden spoons. The men are served first, while the women eat by themselves what is left. Politeness demands that the host, no matter what his rank may be, should himself serve the guest ; he first tastes the dishes before presenting them ; he points out the best morsels to his guests, and if the latter hesitates to take them puts them into his mouth. When the *douar* receives a distinguished guest the repast is furnished by the whole community. The inhabitants of the *douar* then arrange themselves around the guest in a series of concentric circles, graduated by rank. Each dish, after having been tasted by the guest, is served successively to the different circles, and the bones, carefully gnawed, are finally given to the dogs, silent, though expectantly watching the proceedings from the outermost circle. All natives have an abiding faith in amulets as a means of preserving health. These amulets are small scraps of paper on which are traced a few cabalistic signs and words from the Koran. The natives of the town are more given to ablution than the Arabs, these latter being extremely filthy. The children of all the Algerian races are extremely precocious and very intelligent, but their development is early arrested and the intellectual faculties weaken rapidly.

The inferior condition of the native women, which aids in the transmission by heredity of many faults, plays an important part in the tendency to degeneracy. They rarely are acquainted with anything beyond their

own *douar* and their intelligence concentrates itself on a restricted circle of vulgar ideas. The men never condescend to converse with the women, and these are forbidden to talk with strangers. Universal ignorance prevails, except that every little community is likely to have its *thaleb* or scholar learned enough to read a little of the Koran. The Moslem religion is far from being in a pure state in Algeria. There is no tribe but has its favorite saint, to the tomb of which the people repair constantly to pray. The body of the saint is sheltered by a domed chapel, called *koubba*, which has in the middle a catafalque covered with silk and brocaded stuffs, and on the walls banners of silk and offerings. Sometimes the *koubbas* merely cover the spot where a saint has passed the night. The natives are very superstitious and fear the evil eye, not only for themselves but for their cattle. The numerous idiots met with are objects of great attention because they are supposed to be possessed of a devil whom it is prudent to propitiate. As a rule the farther you go towards the desert, the purer is the Arabic spoken by the people. The Algerians of course speak French, and generally without the slightest accent.

The native Jews speak among themselves a corrupted Arabic with which are mixed a considerable number of French words with Arabic inflections. In the province of Oran Spanish is generally spoken. In character the Berbers are revengeful, courageous, and honest among themselves, though rapidly learning the Arab vice of cheating the stranger. The social unit among the Berbers is the *kharrouaba* or members of one family, sometimes admitting others; and sometimes families and

even villages unite in common interest, and thus a little republic may be formed. Each village is governed by an *Amin*, or sort of mayor, who is assisted by a few of the chief men of the village. The *djemaa* or municipal council, meets once a week to deliberate on the affairs of the community, all the males from the age of sixteen taking part. The Moslems here have no real clergy, and the Mufti is more a magistrate than a priest. The caste of the Marabouts has great religious influence, the quality of which is hereditary in the male line of all those who have led an exemplary life or who have consecrated themselves exclusively to the defence of Islamism against infidels. They used to live in convents. All do not know how to read, but to them is intrusted the education of the children. This education consists in teaching them a few prayers, some chapters of the Koran, which they learn by heart, and a little reading and writing. Even the very "learned" Marabouts never pass the line of instruction in European primary schools. Though polygamy is authorized by the Koran, the great majority of the Moslem population do not take advantage of it, simply because they cannot afford it, and for no other reason. The woman's position is practically that of a slave to her husband, and an ill treated one at that. Sabbatical rest is unknown to the Moslem; the Friday services, at which they are obliged to assist, last but an hour, and they can then employ the rest of the day in their usual labors. On the plains life is comparatively easy, seed time and harvest taking up about three months in the year, and the rest is spent in idleness. The cattle, sheep and horses require only to be led to fresh pasture, and are attended by the children. The

women make the *haïks* and *burnouses*, the chief articles of clothing for all. The men make the wooden part of their ploughs and plait baskets and ropes, which, with a two edged pick axe, made by a blacksmith, constitute their stock of agricultural tools. Earthen and wooden dishes, a pitcher and a kettle, comprise the kitchen and table utensils. The furniture consists of a few mats, a wooden chest, and sometimes a carpet. In the cities, industries are more active and diverse ; there are found especially potters, dyers, armorers, blacksmiths, tinkers, carpenters, tanners and an incredible number of shoemakers ; which seems surprising in a country where so many of the people go barefoot. Every Thursday the city women pass the afternoon at the Moorish baths, where they wear the most beautiful toilets. On Friday they go to the cemetery, less to pay regard to the dead than to take the air in perfect liberty. This seems a strange place for a reunion, but it is probably selected as less exposed to the gaze of strangers.

To-day all the tribes have lost the freedom they enjoyed under the Turks ; the natives are directly governed by agents in the pay of France, and their laws are greatly simplified. They have preserved all the practices of their religion, and the rare attempts at proselytism, either by the Protestants or by Romanists, have been without result. The principal Arab settlements of those hordes who came here, driven by hunger, from the shores of the Red Sea, have been in the southern parts of the province of Oran (Tlemcen) and in Morocco. The nomadic life has such a charm for those who have tried it in their youth, that it is impossible to even think of drawing the Arabs of the high plateaux, or of the

Sahara region, from this mode of existence. They are like sailors, in their love of the monotony of vast expanses and solitude.

A passport is not necessary in Algiers, but you are required, at the hotels, to give those items of information about yourself that the police prize so highly. Then you are free to go and come at your leisure.

Of the various excursions in the neighborhood of the city, that to Blidah and the gorge of Chiffa is the most often recommended. At the former place are wild and rugged scenery, great rocks, and running streams, and troops of wild monkeys, that sometimes show themselves to tourists. The trip to Blidah I took on my way to Oran. The line first skirts the beautiful bay and then, at ten kilometres distance from the city, turns to the southwest and enters the Metidja, the plain of great fertility that lies between the Atlas foot-hills and the Sahel. Tall eucalyptus trees at times line the track and are seen in many groves. Tree planting on a vast scale has been undertaken in Algeria and with the most beneficial results; where formerly were sun-scorched desert, and sterile hillside, or damp miasmatic swamp-land, the beneficent eucalypti spread their limbs, filling the air with balsamic odors in place of miasm and giving shade and fertility. The town of Boufarik is an example of what European energy can accomplish in Africa, with its stream-bordered streets, shaded avenues and squares, where was once a swamp so malarious that the first settlers died like sheep. The native trees of value are the cork, cedar, ilex, the Aleppo and maritime pine, the olive, fig, the citrus family and the palms. But of all trees the Australian gum trees, the eucalypti, are the

most valuable in the *reboisement* of Algeria. That it is the determined purpose of the French to afforest the north coast of Africa is a fact that commands the approbation of the world. The Metidja is estimated to contain 500,000 acres of land, one-half which can be cultivated with success by irrigation by means of artesian wells and reservoirs. The cereals flourish, but it is in small fruits and vegetables that Algeria excels.

Other pursuits than agriculture draw hither many strangers, especially the pursuit of sport; but, if the farmer's rewards are meagre, so are the returns of the sportsman. The season for shooting lasts from September to February, and, as in France and all her colonial possessions, one must have a shooting license. Partridges, snipe, ducks and woodcock are sometimes found, but not in abundance. Yet there are many wild animals remaining in this country, where "Gerard the lion-killer" found such sport in his time. In the twelve years between 1873 and '84 there were killed above 30,000 wild animals, including 181 lions and 1,000 panthers. The rarest sport is that of falconry, which certain of the Arabs indulge in at the South. It is said that the art of training falcons is hereditary, and it requires great skill and patience. The hawks are snared and hooded and perched upon their master's shoulders, which are protected by strips of leather. They are fed only by their captor, and when they have become attached to him, after two months or so, they are taken to the field, hooded, and the hood removed only when the quarry is in sight, at which they fiercely dash.

It was a short run of 30 miles to Blidah, a town of

8,000 inhabitants. It lies at the base of the Atlas range, with the Metidja spread below to the Sahel beyond. An omnibus carried me to the hotel, where I found a neat room, a cool inner court overhung with vines, good meals and excellent service. I went first to see the *Bois Sacré*, the sacred grove of olives, in the suburbs of the town. These trees are sacred because they contain and shelter the *koubbas*, or mosque-like tombs of some Arab saints. They are indeed beautiful, these white and marble-like structures, with domed roofs; and the giant olives hung with trailing mosses rise above and enclose them in a twilight gloom that is conducive to thoughts of worship. Now and then the sun strikes through the canopy of foliage and draws a tracery of leaf and limb upon the marble surface of the tombs, painting these fleeting pictures all day long. Silent Arabs glide stealthily away emerging from the gloom, pausing a moment to pray perhaps, then disappearing again without a sound.

When I resumed my journey next morning I found the train crowded with excursionists, for the scientific men of all France had come to attend a meeting at Oran. They were true excursionists nevertheless, and all eager to get their money's worth as they went along. The infrequent towns along the line, as they are generally at a distance from the railroad, much resemble each other, and hardly any one is of conspicuous interest. Most of these towns are of recent growth, dating from the French invasion. The remains of the Arabs consist chiefly of the omnipresent *koubbas*, which gleam white on the hill-crests, or adorn some swelling elevation of the plain. We reached the station of Oran at

about eight o'clock in the evening. An unusual influx of strangers, owing to the assembling at Oran of the French Congress of the "Society for the Promotion of Science," promised to fill every hotel and *pension*. But I found a room at the Hôtel Continental, and there seemed to be accommodations sufficient for the 500 strangers attracted by the fêtes promised to the Scientific Congress. Bull fights and excursions, illuminations and native dances, all these were in store for the traveller who would remain; but I had come merely to learn the time of departure of the steamship for Spain. This information gained I was ready to leave next day for Tlemcen *via* the French-Arab village Aïn-Temouchent. Several days later I returned and devoted four days to an examination of Oran. I found it more interesting than my previous view had promised. Not that I would recommend it as a place of resort either for health or pleasure, though a week might be passed there without loss of time or patience.

The city takes its name from the ravine (Wahran) behind it. It was the seaport of the kingdom of Tlemcen, and attracted many of the Moors who were driven out from Spain. At the beginning of the 16th century the corsairs of Oran had become so troublesome that Cardinal Ximenes fitted out two expeditions against the city. In the second, which he led in person, the city was taken and the citadel, supposed to be impregnable, was carried by storm. This *Kasba* is a vast fortification. The walls rise 40, 50 and in places perhaps 100 feet above the roadway; they throw out buttresses, project ornate sentry-boxes, and frown upon the steep ravines as well as directly upon the most thickly settled

portion of the city. In fact, one can hardly turn a corner without coming upon a fortress wall, a stone tower or vestige of some demolished castle. Many of the houses are built into and out of these ancient walls; the city is full of ruins and the suburbs are seamed with the lines of former military construction. The scars of sieges and earthquakes are mostly covered with vegetation, as every available plot of earth supports a garden overrunning with vines, fig trees and flowering plants. The Spaniards held the place for two centuries, lost it in 1708, retook it in 1732, and finally surrendered it in 1792; and the Algerines kept it till the French conquest in 1830.

No port of the Mediterranean, perhaps, can exceed Oran in picturesqueness. The town itself is built up the steep northern slope of the hill, the great ravine, Wahran, almost bisecting its upper portion, but filled in towards the sea and covered over with buildings. A thousand feet above the town rises the hill crowned by the fort of Santa Cruz; a little before it stands a Gothic chapel crowned by a colossal statue of the Virgin. The white figure seems to extend its blessings to those who have performed the work of suppressing here the religion of Mahomet. But, as if to mock this endeavor of the Christians to commemorate their achievement, the Arabs have erected a tomb to their patron saint of Oran, Sidi Kebir, on the crest of the ridge, several hundred feet above, and the white dome of this "*Marabout*" is visible further than the marble figure of the Virgin. And in the town beneath the great mosque of the Moors is as vigorously protected by the Government as the cathedral of the Catholics. One evening, an hour

before sunset, I climbed the steep road that leads to the fortress of Saint Grégoire, a few hundred feet below the chapel, and then clambered over the steep to the chapel and fort above. The ascent was so sharp that I could hardly maintain a foothold ; yet up this mountain, more than once, had mail-clad soldiers dashed to the charge. I finally reached the fort only to find the entrance barred and the structure deserted. It rose above me stern and frowning, without a projecting scarp or abutment by which one might lay hold and climb to its parapet ; yet this same fortress had been twice taken by assault ; how, no one can now conceive. The only approach to it at all is along a knife-like crest on which you may sit astride, and even then there seems but slight hold for scaling ladders to be placed. How many must have perished ere the strong walls were taken ; every crimson rock must have been drenched in the blood and the entire crest covered with the corpses of the slain. Beyond, across a deep gap in the ridge, there is a table-topped hill even higher where, on the edge of the precipice, is the white tomb of Sidi Kebir. From this dominating point the fortress could be bombarded, and doubtless the troops of Ximenes brought cannon here and first opened a breach in the walls before they pressed on to carry it by assault. The view from the chapel, fort or tomb is most magnificent. To the north the far-sweeping horizon line of the Mediterranean, east the harbor, and beyond a yellow coast crowned by the distant mountain of Kristel ; from the base of the hill stretches the town, with creamy walls and roofs of sunburnt tiles, its surface broken by domes and minarets and the towers of church and cathedral.

At least eight forts, including the two on the hill, can be seen ; they guard every strategic point and thrust out their massive walls from every hill and angle of the wall. For this city is still surrounded by walls, with bastions and gates, and is guarded as in the time of the Turks and Moors. Beneath and towards the west a projecting promontory, some four miles from Oran, shelters a beautiful bay and quiet village. The point is strongly fortified and the fort of El Kébir, said to cover the site of one previously erected by the Romans, has undergone as many vicissitudes as that above Oran. Reminiscences of Spanish occupation are found here in the arms of Ferdinand over the fountain at the entrance, and on the shore of the bay towards Oran in some warm mineral baths known as *Les Bains de la Reine*, from the visit of Isabella early in the 16th century, with her infant daughters. An excellent road leads around the coast in this direction, leaving the fort beneath high cliffs, passing through a short tunnel, and all the way giving far-reaching views of the sea. The ravine and steep escarpment of the hill towards the town are thickly planted with pines so as to form a dense forest in refreshing contrast to the denuded rocks around. Some of the trees are a foot in diameter, and all are carefully tended under the oversight of the same wise Frenchmen who are looking to the future reclamation of these barren hillsides. By this means they have entirely changed the aspect of the scenery and added a new element of beauty to the view. Although the hills seem barren yet they are covered, as are the plains, with flowers of every hue, that spread out sheets of color here and nestle in sheltered places there, growing

out of crevices in the rocks and in the nooks and crannies of the fort. Perhaps the best place whence to view the castle-crowned hill is from the terrace or garden rising above the fort and planted everywhere with shrubs and flowers. Winding walks lead all about and through the branches of pines and date-palms gleams the red hillside with its yellow-walled forts. Some of the terraces are covered with a small vine bearing thick mats of flowers and are perfect sheets of purple bloom. Here also you look down upon the enclosed harbor, the scene of busy maritime life, where there are sometimes a dozen steamers moored and where a thick cluster of lateen rigged vessels occupies the inner quarter of the mole. Railway tracks lead out to the main station, a mile beyond, and thence run to Algiers, to Tunis, and far into the border land of the great desert. This port of Oran is at a time not far distant destined to be the great centre for an immense commerce with the interior of Africa perhaps, and certainly of Morocco. Oran has a museum with a well-arranged collection of marbles and mosaics, mostly obtained from towns to the north. These mosaics are all Roman, and some of them cover a surface of fifteen square feet and are of excellent workmanship. I have mentioned the mosque. Its minaret, detached from the main structure, is a conspicuous object in the centre of the town and is beautifully ornamented with border tiles. The main entrance of the mosque is handsome, but it is a restoration by a French artist and lacks the charm of antiquity. Nobody seemed to know where Tlemcen was when I made inquiry at Oran, but at last I was told to go to Aïn-Temouchent by rail and there take the diligence.

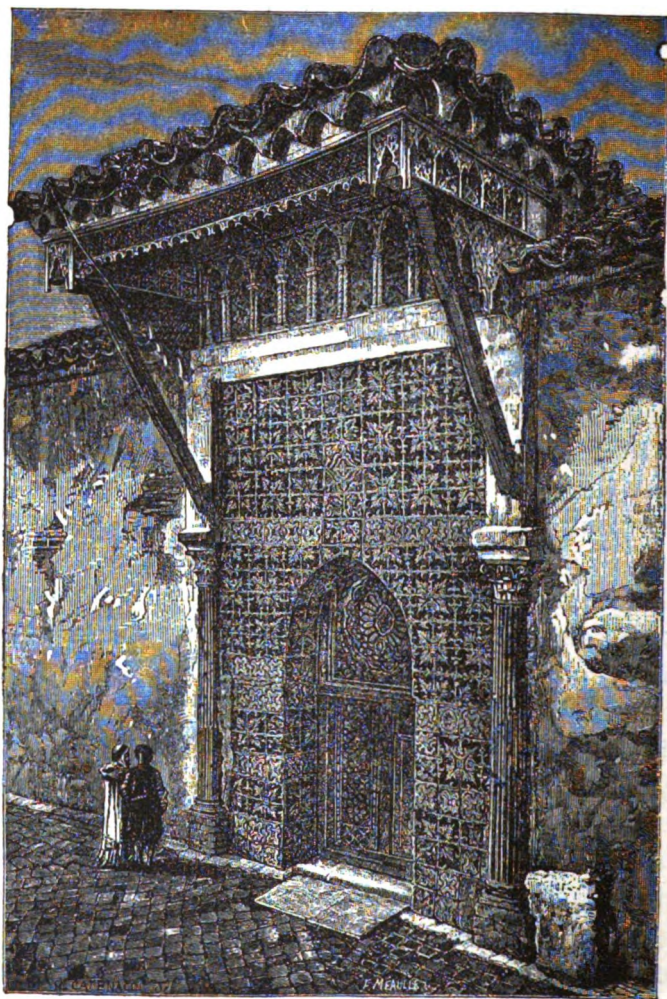
This I did. The roads were excellent and the scenery was interesting. To maintain this highway to Tlemcen in a perfect state, the road menders are stationed at intervals, who fill the ruts with broken rocks, and lay out long beds of this material, which the diligence must drive over because large rocks are laid on the smooth portion of the road. Our course, consequently, was a very sinuous one, as the driver had to veer from side to side to avoid the lines of rocks.

The first distinct sign of an approach to the desert was a group of Arab tents and a drove of camels. The camels were ranging the barren pasture land and seemed as much at home as cows in a field of clover.

Along in the afternoon we climbed the outermost brim of the valley in which Tlemcen was situated, and saw it before us, a fair city of mosques and minarets rising from leafy gardens.

Tlemcen is unique. It is a Moorish or Arab city, of ancient date, and with architectural monuments that remind one of the Alhambra. It was about 1,100 years ago that the Arab city was founded here, upon the ruins of what the Vandals had left of the Roman city Pomaria. During 400 years, Tlemcen enjoyed great prosperity. It was a great commercial centre and contained at one time, it is estimated, 5,000 Genoese, Catalan and Venetian merchants, who occupied a quarter by themselves. The city is surrounded by several lines of fortifications, for it has been many times besieged and taken.

I began a tour of the city with the great mosque, Djamaa-el-Kébir, in the Place d'Alger. It is not notable above even the mosque in the city of Algiers, though its court



GATE OF A MOSQUE, TLEMCEN.

is paved with Algerian onyx, and the basin of its fountain is of the same material. It has seventy-two square columns and a beautiful *Mihrab*, or prayer niche, ornamented with arabesques. The minaret is about 100 feet high, and from its cupola I got a view of the city that rewarded me for all the journey. The mosque dates from 1136. Another mosque within the walls is now used as a schoolroom. This is the mosque of Sidi Ahmed Bel Hassan el Ghomari and its *mihrab* is decorated with arabesques as airy and delicate as any in the Alhambra. There are two other mosques with very beautiful minarets, just outside and below the western wall. The finer of the two is that of Sidi el Halani, or the sweet-meat maker, with a minaret decorated with mosaics and a great court with arabesques, and with columns of Algerian onyx. It has finely carved ceilings and is comparatively modern, being only about 500 years old. This mosque lies under the hill, and as you descend you can look down upon the minaret, and the court, and view the ground plan of the buildings. Upon the square top of the minaret, as upon that of every tower in the city is the huge bulk of a stork's nest with the great birds keeping guard. "Before the Arabian Conquest," wrote Mungo Park, "or about the middle of the seventh century, all the inhabitants of Africa, whether descendants from Numidians, Phœnicians, Carthaginians, Vandals, or Goths, were comprehended under the general name of Mauri, or Moors." All these nations were converted to the religion of Mahomet during the Arabian empire and among the first must have been the dwellers in this ancient city Tlemcen, for we find tombs of the saints over 1,000 years old.

About a mile from the city is the most venerated of them all, that of Sidi Bou Medina. Leaving the city by the gateway of Bou Medina, I went to the cemetery which was crowded with women, closely veiled, and gathered as usual in groups about the tombs, and especially around the square monument of Sidi Senousi, the founder of the sect of the Senousi'ya.

Some one has written : " Regarding the scene from a purely artistic point of view, we can imagine no more fitting subject for a painter than this group of Arabs at their devotion ; nature their temple, its altar the setting sun, their faces toward Mecca, their hearts towards the Prophet, their every attitude breathing devotion and faith." The cemetery is thickly set with graves, and one needs caution not to stumble over the numerous headstones, which are quaintly shaped and carved, and many of them picked out in colors, red, green or yellow. A solemn place this, and conducive to reflection, with its many memorials of the dead and its venerable olive trees. It should be seen by moonlight, however, to be most effective ; then indeed does it suggest an unreal city by the banks of the quiet river. Beyond the graveyard is the mosque of Sidi Bou Medina, entered by a narrow way, sometimes closed by doors of bronze, doors of such exquisite workmanship as to suggest the highest art. The pattern is an interlaced geometric figure and they recalled to me the bronze doors of the mosque of Cordova. The decoration of the mosque is good, but much is modern and its effect is somewhat tawdry. Stepping down, below the level of the court, we enter the *Koubba*, or tomb, of the saint of Tlemcen. This tomb is approached through a small court, in which is a well

with a curbing of stone which has been deeply worn by the use of 700 years. An old Arab sat here, guarding the sacred place from unbelievers who should venture to approach with irreverent feet. The interior of the tomb is hung with silken draperies, banners that are said to have been taken in Spain, ostrich eggs and other offerings of the sons of the desert. In one corner is an object seemingly incongruous, and that is a grandfather's clock. How many years it has ticked away the time in that ancient tomb, no one knows. Directly in front of the entrance way to the outer court, rises that of the mosque itself, ornamented with mosaic tiles made in Morocco. Everywhere, even in this most sacred place of the Arabs, I was treated with respect, and received with a grave courtesy that would have repelled the idea of a fee—had it not been for the ever extended palm. Sidi Bou Medina has a delightful situation, and the surrounding Arab village, though dirty, yet is charming in little stone houses and walled vineyards and gardens. On our way back, we made a *detour* that took in another holy *Koubba* in a delightful cemetery, that of Sidi-Yakoub, which is of the general shape and symmetry of the tombs of Blidah, in the sacred olive grove. Not far from this is the great minaret of the Aghadir, a mosque long since destroyed, and which is over 1,000 years old. All about the plains and slopes this side of Tlemcen are the ruins of walls, towers and minarets. Three circles of fortifications can yet be made out, surrounding the city. That afternoon we went out exploring in a different quarter and came upon an open field, gay with scarlet poppies and dotted with knotted old olive trees. Climbing away beyond, the pathway led up the cliff, several hundred feet

high, and after much difficulty I reached a plateau above. Here I found another *koubba*, placed upon the verge of the cliff, and visible from afar.

The view from the *koubba* is magnificent, taking in the whole valley in which Tlemcen is built, the mountains of Morocco beyond, and a faint glimmer of the distant sea. Down the face of this cliff fall two sparkling streams, one towards Tlemcen, and the other towards Mansoura. Mansoura is another city, a city that has perished all but its walls. During one of the long sieges of Tlemcen, nearly 600 years ago, the chief in command turned his military camp into a city by building around it a wall forty feet high, enclosing about 250 acres. At points, about 100 feet apart, high towers were erected, battlemented and pierced. From the plateau I counted eighty towers yet remaining. It was a beautiful scene, that broad plain bounded by hills, in its centre the twin cities, Tlemcen and Mansoura, the one living, the other dead. High above the walls and towers rises the great minaret of the mosque Abou Yakoub commanded to be built. It is about 120 feet high and is called "by far the most beautiful monument of Moorish times in Algeria." It is half in ruins, but has been strengthened by the French. It resembles the great tower of Seville, the Giralda, and, like that tower, is ascended by a series of ramps, instead of stairs, so that a horseman might ride to the summit. Were this the only monument here, tourists would come to view it. As to its color an artist writes : "Photographs may help you a little to imagine the place ; but, having looked at them you must shut your eyes and color minaret and walls with richest, reddest ochre ; you must

clothe the hills in living green, fill the space between hill and sky with soft warm skies of southern blue, and then set the whole picture floating and palpitating in golden mists. This minaret is unlike anything else in the world. It is like a gigantic monolith of solid Indian gold, and is as wonderful as the pyramids."

I returned to the city through the Fez gate. The air was pure and bracing, under the hot sun, and filled with flower perfume and the hum of bees. "It had been one of those celestial days when heaven and earth meet and adorn each other; it seemed a poverty that we could only spend it once."

I went to the market, one of the primitive kind, where vegetables were found in one corner, meat in another, and articles of domestic manufacture in another. All the marketing is done in the morning, and by noon the place is swept and garnished for health's sake; for these Arabs are now under French rule, and can no longer sit all day in the sun and fester and emit evil odors. But the most interesting of all is the Arab quarter, where the streets are narrow, where the shopkeepers sit all day in little dens about eight by ten feet square, each one with different articles for sale. Here we see the handicraftsmen at work; the shoemakers who make those wondrous slippers without heels, of gorgeous red and yellow, ornamented with gold and silver braid, and the tailor, whose duties are not very arduous, as all his costumes are of the same pattern. It is thoroughly Oriental and yet African. In these dens you find groups of gentlemanly Arabs, who are glad to have you join them in a cup of coffee and help them "at doing nothing all day in a row." Every

street has a minaret terminating it or rising at one side, and upon the summit surface of every minaret is a bulky nest, the home of the solemn storks. I sat on the hotel roof one night and watched a stork outlined against the amber sky, and the moon came out and lit up the narrow streets through which noiselessly walked hooded and sheeted Arabs, like a crowd of ghosts. It was my last picture of Tlemcen.

THE HITTITES.

BY THE

REV. LYSANDER DICKERMAN.

Attention is called to the story of a nation, every one of whose monuments, till recently, was buried and forgotten, or else regarded as unworthy of notice. During the last few years, time worn and weather-beaten statues, reliefs and sculptures have borne unexpected testimony to an originality in architecture and art ; while the records of contemporaneous nations have told us of successes in warfare, of familiarity with diplomacy and science, which prove the existence of an ancient factor in promoting civilization not hitherto recognized. We have just begun to trace the footsteps of a people, confined within no narrow bounds, whose numerous allies, whose acknowledged valor, and whose acquaintance with the arts of peace compel us to class them among the most powerful nations of antiquity. It is the scattered fragments of this people's history which we are to garner, as best we may.

It is well known that in the time of Abraham there was in Asia a movement of the people pushing southward. It is not surprising that some of those wanderers, in pursuit of better pasturage for their flocks, should encamp along the eastern border of the Delta and look over with longing eyes on green fields along the banks of the river of Egypt. In a tomb of Beni Has-

san, built for Prince Knem Hotep, who lived under the XIIth dynasty, it is recorded that the immigration of Semitic tribes in his day was not unknown. A party of 37 immigrants from Absha, with their beasts of burden, babies and baggage, came begging permission to settle on the banks of the Nile. These may have been the forerunners of hordes that poured into Lower Egypt, awaiting the time when civil dissensions and the consequent weakness of the Egyptian government would enable them to seize crowns and sceptres, without the shedding of blood.

The Egyptian monuments call these foreigners: "*Mertiou*," meaning "to feed," or "feeders;" "*Sati*," meaning "Asiatic shepherds," and "*Aat-tu*," "a flail, scourge or pest." The Greeks called them Hyksos. What they called themselves we do not know, or how much Scythian element entered into their blood. The monuments they left in Egypt have recently become objects of great archæological interest.

In the Boulaq Museum is a bust, in grey granite, of an apparently kingly personage. It was found at Mit Fares, the ancient Crocodilopolis of the Fayoum. The features attract attention by their quiet dignity. The face, set in a frame, so to speak, of artificial hair, parted in the middle, is full and angular; the cheek bones are high, the eyes small and covered with thick eye-lashes, the nose flat, the mouth full of scorn, and the limbs plump and hard. The mutilated condition of the monument does not permit us to say *what* the hands once held, whether sceptre or rod, weapons or other implements.

Not less remarkable is another bust, which probably

came from Tanis, and is now in the Villa Ludovisi at Rome. It is executed in the same coarse style as the other, has the same prominent jaw bones, protruding lips, and curly beard, only the manner of wearing the hair is different. It falls over the shoulders in four thick locks, while on the back of the head is a tightly twisted pigtail of four thinner locks. This monument bears no name, and in the absence of the uræus, or asp, over the forehead, there is no proof that it was intended to perpetuate the memory of a king.

In the Museum of Boulaq is a colossal sphinx, in black syenite granite. It was found at Tanis with three other sphinxes of similar style and workmanship. "The expression," as Mariette said, "is full of majesty." A thick mane, like that of a lion, covers the head. This statue is doubtless the work of some skilled artist, and is the portrait of some kingly personage—some have thought that of Joseph, others that of Joseph's Pharaoh, made by order and direction of Joseph. This sphinx never received the customary cartouche of the king whose likeness it bears, but, by usurpation, three later sovereigns inscribed on it their titles: Apepi, the first king of the XVIth dynasty; Merenptah, son and successor of Ramses II. and Psousennes of the XXist dynasty.

At Tanis have also been discovered the statues of two persons, standing on a common pedestal. They have the same general features which characterize the sphinx. It is generally supposed they were contemporaneous kings, perhaps father and son. Their hands seem to be occupied with an ingeniously arranged offering of aquatic birds, fishes and flowers. Nothing can be more

apparent than the total dissimilarity between all these statues, and those that are purely Egyptian; especially is this true with respect to the treatment of the hair. This statue is also at Boulaq. Who were these foreign scions of royalty? To what homogeneous or heterogeneous tribes did they belong?

Following the thread of Egyptian history from the first dynasties down to the XIth, XIIth and XIIIth to the Antefs and Mentuhoteps, the Amen-emhats and Usertesesens, the Sebak-hoteps and Nefer-hoteps, the golden age of Theban power, art and civilization, suddenly there breaks upon us a dark age. Between the fourth king of the XIIIth dynasty and the last king of the XVIIth dynasty, there was a period of confusion. The cause was a foreign invasion. In the language of the politicians of California: "Hordes of Mongolian barbarians overran the sacred soil." Lepsius thought they came from Arabia, and were possibly the biblical Hittites. Julius Africanus, who edited and condensed the history of Manetho, said they came from Syria, and were allied to the Phœnicians. Mariette-Bey was certain that their last dynasty was of Hittite nationality. Chabas thought they were mixed, predatory, wandering tribes, with no affiliation at first, but growing into a compact nation after they settled in Egypt. De Rouge maintained that they were of Canaanite origin. Eisenlohr has discovered that mathematics and astronomy were studied at the court of their princes. Syncellus says that one of their kings, Nubti by name, first added to the year five intercalary days, making three hundred and sixty-five.

These Hyksos reigned in the Delta, with their capital

at Tanis, or Ha-uer, possibly also at Memphis, while the native princes of Thebes paid them tribute. At length a quarrel, which led to blows, broke out between Apepi and Sekennen Ra, who preserved the national traditions of the Thebaid; a quarrel partly about religion and partly about the water-courses. The war which followed is supposed to have been ended by Amosis or Ahmes, the first king of the XVIIIth dynasty, who defeated and expelled the Hyksos.

What became of this great body of foreign warriors, 240,000 strong, after their defeat, is still an open question. Mr. Sayce, on the authority of Num. xiii., 29, which says that the Hittites dwell in the mountains, believes "that Manetho had traditional authority for the statement that Jerusalem was built by the Hyksos after their expulsion from Egypt," and adds that "much is to be said, on the authority of Mariette and others, that the leaders of the Hyksos were Hittites." [*Acad.*, 23 Oct., 1886.]

From the nature of the case we must not expect a rigid mathematical *proof* that the Hyksos were identical with the biblical Hittites; yet a few considerations lead us to suspect that they may have belonged to kindred races.

1. The horse was known to the Egyptians only after the Hyksos invasion. The horse probably came from the Scythian heaths to Irania, thence to the Euphrates and the land of the Hittites.

2. In physiognomy there were so many points in common between Hyksos and Hittite that the presumption in favor of their close relationship is strong. Their high cheek bones, wide faces, flat noses, protruding lips

and retreating chins are an argument for racial kinship not easily refuted.

3. The vindictiveness with which the Pharaohs followed up the expulsion of the Hyksos for more than a century, with military expeditions to Kadesh, Hamath and Carchemish can be most naturally ascribed to revenge for injuries inflicted.

4. Those 240,000 Hyksos went somewhere, and wherever they went must have been a military power to be respected. There were not many distinct nations in Northern Syria, who could defy the power of Egypt on the one hand, and Assyria on the other.

5. Ever since the Hyksos invasion the Egyptian language has been mixed with Canaanitish words as never before. We know too little of the Hittite language, but almost the only proposition that is not questioned, is, that the ancestors of the men who made the tablets of Hamath and of Carchemish must sometime have been in Egypt.

6. Both Hyksos and Hittites worshipped the same God Set or Sutekh. He, and the Canaanite goddesses Baal Astarte and Anat Reshep, were first held in reverence on the Eastern Delta and then all over Egypt.

Max Müller has well said: "To know an ancient *people*, it is necessary to study their physical appearance, language and religion. A race may lose, to a certain extent its characteristic type, through difference of climate, of food, of habit, or through admixture of foreign blood. It may adopt a new foreign religion; it may forget its original language, but if we can find it preserving a type, a religion and a language which all belong to one original pure stock, we are then able to recognize

the relation of the stock to others of the same human family."

Accepting this dictum of Max Müller, we are authorized, for want of a better name, to call the Hyksos Hittites, yet remembering the Apostle's sage remark: "They are not all Israel that are of Israel," we cannot follow the history of these people across the ages without a break, or relate continuously the story of their political and social life. Our sources of information respecting them are four:

The *first* is the Bible. It speaks of *two* classes of Hittites: those of southern Palestine and those of the north, beyond the promised land. When Abraham led his Semitic tribe from Haran to Canaan, "the Hittites filled the land." (Gen. xxiii., 7) Of the few towns there built, a feeble branch of them occupied Hebron, near which was a cave that Abraham bought for a tomb. The lofty sentiment and polished courtesy under the cover of which they secured a large sum of "money current with the merchant," for a worthless cave in a worthless field, mark them as a mercantile community in a high state of civilization. Abraham and Sarah, Isaac and Jacob were all buried among the Hittites. Notwithstanding their consummate politeness, when Abraham needed help to fight Chedorlaomer, he went not to swarthy Hittites but to the white, blue-eyed Amorites.

In the book of Numbers (XIII. 22) it is said that "Hebron was built seven years before Zoan in Egypt." When we observe that the Hebrew word Hebron comes from Habar, "a companion," and that seven years after Hebron, a companion city *was* built in Egypt and called

The collections of the author.

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by the same name, Ha-uer or Habār—from which comes the Greek Avaris, the presumption is strong that both cities were built by the same people, call them Hyksos or Hittites as we may.

The Hittites were said to be the sons of Heth. Heth from *halat*, in a causative sense (see Job. viii., 14) means “to terrify,” “to play the giant.” This corresponds with the *appearance* of the statues of men and sphinxes, found at Avaris, and we know with what consternation the spies whom Moses sent to the land of Canaan returned saying: “All the men we saw are men of great stature, . . . and *we* were in our sight as grasshoppers, and so *we* were in their sight.”

However much the sons of Heth appear to be dreaded, his daughters were not less so. Rebecca said to Isaac: “I am weary of my life, because of the daughters of Heth. If Jacob takes a wife, such as *these*, of the daughters of the land, what good shall my life do me?” Perhaps her reference was to Judith and Bāsh-emath, the Hittite wives of Esau, and, therefore, the traditional relationship between young wives and their mother-in-law may have been of Hittite origin. We are indeed told that Solomon loved Hittite women, (1 Kings xi., 1) but this is a doubtful compliment.

There seems to be a special bitterness in Ez. xvi., 3, where, in an eloquent invective, Jerusalem is taunted with having an Amorite father, and, what is the meanest thing that could be said of any one, a Hittite mother. Prof. Sayce suggests that a Jebusite was a cross between an Amorite and a Hittite, but the only thing certain about this passage is that the Hittites had exerted too strong an influence over Jerusalem, perhaps an

hereditary influence, affecting (1) complexion and features, (2) faith and religion.

Another biblical passage (2 Sam. xxiv., 6.) clearly refers to the great body of the Hittites who dwelt in the *North*. When Joab and his captains went out from the presence of David to number the people, they came to Gilead and to the land of Tahtim Hodshi. It is certain that this Tahtim Hodshi was to the extreme north of the kingdom of David. The exigencies of the account imply this; and if this be granted, the itinerary is perfectly intelligible, otherwise not. From the east of the Jordan, Joab went to Aroër of Gad, to Jazer, to this Tahtim Hodshi, thence to Dan, to the coasts of Tyre and Sidon and then to Beersheba. This Tahtim Hodshi has been a puzzle to translators and commentators. The latest "revisers" seem to know no more about it than their predecessors, and have simply given us the Hebrew words in English letters. That the text is corrupt is evident from the fact that Tahtim is an adjective in the masculine plural, and cannot qualify Hodshi, a noun in the singular feminine. Leaving out of the account the Hebrew vowels, there is only the difference of *one* letter, between Tahtim and Hahtim. "*Tau*" and "*he*" are often confounded in manuscripts, especially if one happens to be badly formed. Hahittim is the land of the Hittites. Cardinal Ximenes evidently supposes Hodshi to be a corruption for Kadesh, for he translates, (Complutensian Bible, tome II. f. xii.):

"They came to Gilead, and to the land of the Hittites of Kadesh." The identification of Hamath and Carchemish makes this translation perfectly reasonable.

Lagarde also, in his edition of Lucian, has adopted the above Greek translation.

For more detailed information of the Hittites of northern Syria, we must go, secondly, to the Egyptian monuments. They are there known as the Khita. It was under Thothmes III. of the XVIIIth dynasty that they are first mentioned as a distinct people of Asia. Fifteen expeditions this king made against the tribes of northern Syria. He met no resistance till he reached Kadesh. After its fall he took Hamath, then Aleppo, Patina, Batua, and last of all, Carchemish. In the record of the fourteenth expedition he says: "And the tribute of the great country of Khita, in this year, was eight rings of silver, weighing 301 pounds, a great white precious stone, some chariots in birch wood," etc., etc.

We hear no more of the Khita till the accession of the XIXth dynasty. Ramses I carried war into Syria. Sapalel was king, the first Hittite monarch whose name has come down to us. He did not bow his neck to the Egyptian yoke.

Seti I. found *all Syria* in open revolt against Egypt. There were in alliance with the Khita, "the Lycians, Mysians, Dardanians, the Mesa of Ilion, and Pedássos." Seti's victory was dearly bought. The Khita, never knowing when they were conquered, always ready to renew a battle however discomfited, wore out the Egyptian's patience and he gladly made a treaty with Mourousa, the son of Sapalel. The booty carried home enabled Seti to produce some of his most costly works of art: the funerary temple of Abydos, "Seti's tomb" at Biban-el-Moluk, and the Hypostyle Hall.

When Ramses II. reorganized the army of Egypt, the

Khitan power was at its zenith. It was in the fifth year of Ramses and he was at Kadesh. The city was surrounded by water, and Ramses ~~was~~ drawn into an ambush, fought an army larger than his own, and came out of a two-days' battle with "honors doubtful." He was compelled to recognize the Hittites as foemen worthy of his steel. Motenor, their King, was a sly old soldier. He allowed Pharaoh to capture two advance guards, who said that their king had fled in fear to Aleppo; all the while his immense army was concealed behind the walls of Kadesh. Of a sudden he fell on the Egyptian centre and cut it in two. Eight times Ramses charged the enemy which surrounded him, broke through their ranks and rallied his own army. The fight was renewed, the next day, with more vehemence than before. It was a bloody day. Many a brave Hittite bit the dust.

At Ipsamboul is a picture of this Kadesh battle 77 ft. long by 25 ft. wide. It represents 1100 human figures, besides the animals. The tall slender Egyptians with horned and crested helmets, long swords, shields and spears are clearly distinguished from the thick-set Hittites armed with short swords, lances, bows and arrows—wearing the high cap and boots with upturned toes. One of their princes was drowned, and they are holding him up, heels in the air, to resuscitate him. After this battle, there was no great campaign, but incessant skirmishes and revolts. Peace was impossible until old Motenor was assassinated by his own soldiers. His son Khita-sar proposed to Ramses that an end be put to strife. Both belligerents were weary of the carnage; and after 15 years of warfare, the oldest treaty of peace now existing was drafted by the Hittites, and sent to Egypt, in Hittite

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characters engraved on a silver tablet. Translated into Egyptian hieroglyphics, it may be now seen on the outer wall of the Karnak temple.

This treaty is a witness to the advanced state of Hittite civilization. It shows their familiarity with the art of writing, the extent and importance of their commerce, and the mixture of vigor and gentleness which characterized their laws. It is not occupied solely with questions of peace and war, but regulates diverse international arrangements, and sanctions the extradition of criminals, with the proviso that their punishment shall be mitigated in the country where their crime may have been committed.

This treaty between Ramses and Khita-sar was sacredly kept for a century. Ramses married Ra-ma-ur-neferu, the eldest daughter of his old foe, and Khita-sar accepted Pharaoh's invitation to visit his daughter in Egypt.

A tablet at Ipsamboul says: "The Egyptians are happy to have only one heart with the princes of Khita, a thing which has not happened before since the rule of the God Ra." Their old enemies became their favorites, and nothing was more fashionable in Egypt than imitation of Hittite customs, and larding the Egyptian language with Hittite words and idioms. After this the king of Egypt and the king of the Hittites are found fighting as allies against the Syrians. (2 Kings, vii, 6.)

The next we hear of the Khita from Egyptian sources was fifty years later. If our tentative chronology is correct, the Hebrews had spent their forty years in the desert and were driving the Hittites northward. There was a naval attack on Egypt, near Migdal, by people from

Asia, and in the list of princes subjugated by Ramses III. at Medinet Abou, it is said : "The unfortunate king of Khita was taken alive in battle." This is the last word the Egyptian monuments have to utter about "the Empire of the Khita."

This brings us to the *third* source of our information. A hundred and fifty years after Ramses III. the name *Khatti* appears in the cuneiform inscriptions. Kadesh has disappeared and Carchemish is the sentinel, guarding the road from Egypt to Asia. Its true site, on the right bank of the Euphrates, a short distance north of the river Sagur, was discovered in 1874 by Mr. Skene, British Consul at Aleppo, and the identification was verified by George Smith just before his death. The bronze gates of Balawat, covered with bas-reliefs, representing the campaigns of Shal-ma-nesar III. show that the ancient Carchemish was the same as the modern Djerablus. This identification is regarded as settling the question, "Where did the Hittites live?" for all the wars on Hittites, made by Syria on the one hand, and by Nineveh and Babylon on the other, had to begin with the capture of the Hittite Carchemish.

Tiglath Pileser I. perhaps contemporary with the Judges of Israel, says that the dominion of the Hittites extended from the Lebanon to the Euphrates, and even to the Black Sea. The Syrian tribes were subject to them. Pethor, the birth-place of Balaam, had fallen into their hands. Cappadocia was tributary to them. It was Tiglath Pileser I. who dealt them their first deadly blow, and during his reign their strength began to decline.

For 400 years a conflict was carried on with various fortunes between the Assyrians and the Khatti. Assur-

nazir-pal (883-858 B. C.) led his army to the Lebanon, and on an inscription found at the foot of a pyramid at Nimroud (Kalash), is a list of the booty he took from the Hittites: "Silver, gold, tin, copper, oxen, horses, and sheep." From Carchemish he carried home chariots and warlike implements.

Shalmanesar was a formidable enemy of the Hittites. In his tenth campaign, 842 B. C., he captured 87 cities belonging to Sangar. After Sangar, Pisiris was the Hittite king. Assyria was in trouble, and he thought it a favorable time to strike for independence. "He reckoned without his host." The annals of Tiglath Pileser II. are in fragments, but respecting one sentence there is no doubt: "Tribute from Pisiris, king of the city of Gargamis." Pisiris was still King when Sargon ascended the throne, in 722 B. C., and during the change of dynasties at Nineveh, again sought to throw off his yoke. He underestimated the spirit of the new king, who hastened to Carchemish, 717 B. C., plundered it, loaded Pisiris with chains and transported him and many of his subjects, beyond the Euphrates, and made Carchemish the seat of an Assyrian satrap. Isaiah hears the news, exults over the triumph of Sargon, calls him "the rod of the divine anger," and exclaims: "Is not Calno as Carchemish?"

Thanks to its advantageous position, Carchemish does not perish yet, but regains its ancient power. Incorporated with a great empire, it becomes the emporium of the commerce between Mesopotamia and the cities on the Mediterranean. Its *mina* was the standard weight throughout Asia, but Pisiris was the last of the sons of Khatti, whose name has come down to us.

Our fourth source of information is the monuments of the Hittites themselves. These are not so numerous or so imposing as are those of Egypt or of Assyria ; yet our surprise that there are so many will be pardoned when we think how the destroying Scythians swept over the land ; how the Seleucidæ, with their mania for building and rebuilding occupied the territory ; how the Romans followed the Greeks, each pulling down to build up ; how the Mohammedans drove out the Byzantines ; how the barbarous hordes of Crusaders captured and sacked most of the towns on the plains adjacent to the Orontes, how for centuries the Turk—the very evil genius of destruction as he is, has been fulfilling his destiny by (—) turning its splendid temples into heaps of ruins. The spoiler has been in the land 2500 years, yet, on the other hand, it is only within the last ten or fifteen years that the monuments discovered are so numerous, and the similarity observed in them so surprising, that they are now the chief objects of interest to archæologists throughout the world.

The monuments we are to visit are on both sides of the Taurus. They are at Hamath, at Aleppo, at Djerablus, at Sindjirli and Marash in the East, at Karabel, at Ghiaur-Kalesi, at Eflatûn-bounar, at Ivreez, at Boghaz-Keui and at Eyuk in the north and west.

Nobody ever knew exactly where to fix the eastern boundary of Asia Minor. Between that indefinable country which belonged to the Greeks, on the one hand, and the land of the Assyrians on the other, are fertile table lands, watered by numerous streams, extending, at least, over five degrees of longitude and seven degrees of latitude, an area equal to twice that of all New

England and New York. The student of ancient history has not been accustomed to take this vast territory and its inhabitants into account. He learned the stereotyped facts about Egypt, Mesopotamia, Greece and Rome, and was happy that he knew all that antiquity had to teach. Perhaps it is an unwelcome intrusion to disturb this complacency and repose, and that, too, for the sake of a horde of barbarians, who have no place in classic story.

At Karabel, on the road from Smyrna to Sardis, we find engraved on a rock the picture of a warrior, above natural size. In the time of Herodotus it was supposed to bear the marks of Egyptian and Assyrian influence. It must have been regarded by Herodotus as an ancient monument, for his information respecting it was imperfect and the historical occurrences he relates in connection with it are palpably false. We shall see in Cappadocia, in Lycaonia and in Syria the same movement, the same position of the arms, the same conical hat, the same sword, indicated in the same way, the same short tunic, and the same shoes with up-turned toes.

Not far distant is the statue of Cy-be-le, sometimes called "The Niobe," regarded by some as the oldest piece of sculpture in the world. It is a colossal, roughly hewn figure of a veiled woman, carved in the face of a limestone crag. Its antiquity was unknown in the time of Homer. [Iliad xxiv., line 605.] According to Pope, Homer says :

" There, high on Sipylus's shaggy brow
She stands ! her own sad monument of woe ;
The rock forever lasts, the tears forever flow."

This can hardly be a Hittite monument, yet the inscription on it now seems to be Hittite !

Boghaz-keui and Eyuk are two hamlets in the mountainous districts of Cappadocia. Boghaz-keui is in a valley extending from east to west, watered by two streams running in the same direction. Here are ruins of high antiquity; here craggy mountains overlooking the plain, showing the remains of elaborate fortifications; here immense blocks of stone, artistically matched; here graven images, painted pottery, cisterns, stairways and passages, cut in the solid rock; here a raised seat, or throne, ornamented on either side with the bust of a lion. His head and face are in full boss, his body in high relief.

Two miles from Boghaz-keui is an enclosure called Ya-sili-kaia, formed by nature, enlarged and beautified by the hand of man. On the inner surface of its walls are sixty-seven figures of life size and larger, cut in a calcareous crystalline rock of extreme hardness.

On the left the first group consists of thirteen persons, all in the same posture and costume. Each wears a conical headdress, a light tunic, and the boot with toes turned up. The two leaders carry a bow.

The second tablet represents a procession of armed men, bearing emblems or presents. They are bearded and wear the Assyrian helmet, slightly turned up in front. Their costume is a loose robe, striped diagonally and fastened by a girdle.

Another tablet continues the subject, whatever that may be. Eight of the nine persons bear weapons or emblems. One carries a club, another a scythe or reaping-hook; three carry sabres, with crooked blades, and several have the *crux ansata* or round-handled cross.

The two middle figures are an enigma. Two colossal persons stand on a socle, with a sort of barque over their heads.

The last tablet on the left represents persons of a superior rank. The leader wears a long beard and a conical helmet. A woman follows him with what look like enormous rings. Behind the next two persons is an old man with wings. The last figure is overshadowed by the winged globe.

What do these strange objects mean? Is this a procession led by the monarch? Are the people preparing for a festival? or is this the record of some great celebration?

On the right side of this enclosure are two tablets. The first represents ten women, wearing the cylindrical tiara, robes with long sleeves, and bound around the waist by a girdle. The fulness of the drapery is seen in its ample folds. This procession is led by three women in the same costume. On the left we saw a group of thirteen men; now here is that same fatal number of women!

The central scene was the chief object of interest. It is so still. It is the meeting of the two processions. A man of gigantic size, with long beard, conical helmet and short robe is exchanging presents with a woman as gigantic as he. Both bear the *crux ansata* in the middle of a lotus. The man carries a club. A Scythian battle-axe is fitted into his girdle, and, of course, his boot toes turn up.

Though in his costume no attributes of royalty are apparent, his elevated rank cannot be doubted. He is borne on the shoulders of two men in trailing robes.

Behind him are two men, one unarmed, the other with a club, both walking on the mountains.

The queen, or goddess, holds in her right hand a sceptre and stands on a lion, which walks firmly down from the summit of a mountain. Her flowing hair is confined by a girdle. Behind her head is an undefinable figure, the upper part of which resembles the object she holds in her *left* hand. Each of the two principal figures is accompanied by the male unicorn, doubtless the emblem of some religious idea.

In recesses and corridors of the rock, among other figures, is a beardless person, with a conical headdress, the crosier reversed, the semi-lunar hilt of the sword just visible, and, of course, the turned-up boot toe. The left arm of this graceful figure is thrown affectionately around the neck of a smaller figure. Above the right hand is a symbol of something, and behind the head a shrine, overshadowed by a winged star, and supported by two Ionic columns.

What do these pictures and what do these processions mean? A mythological rather than a historical atmosphere seems to pervade it. Was this inclosure the principal sanctuary of the tribe? Was it the abode of the oracle? In this immediate vicinity the Greeks placed the home of the Amazons. Did the Greeks regard the Amazons as myths, or as historical persons? It *may be* these processions relate to the worship of Anaitis, who is fabled to have come, on the back of a lion, from the East, perhaps Media, and that the Cappadocians met her with gifts and welcomed her with pomp and ceremony.

In Asia Minor, before the language and worship of

the Greeks were introduced, kings and gods were pictured standing on the backs of lions or other animals.

The wretched little hamlet of Eyuk (the word means hill) lies 18 miles north of Boghaz-keui. The entrance to the ancient ruins is flanked by two huge blocks, on each of which is cut a so-called Sphinx. The heads and necks are in full round relief, the body in demi-relief, and the legs only roughly formed. Each head seems to be that of a woman. A cloth covers the hair, and hangs down on either side like the mask of Hathor.

Turning from this main entrance to a smaller one on the right, we find on a corner-stone two figures, whose long robes, round caps and crosier indicate the priestly office. The foremost one seems to stand in adoration before an altar. The second one is an attendant, for priests never go in groups or in pairs.

On an adjacent stone is a female form in a long robe sitting on a low wooden chair. Her hair hangs down her neck, and a small pig-tail extends from her crown to the seat of her chair. She wears a necklace, and her arms are enclosed in tight sleeves. Her right hand holds to her mouth a shell or cup, suggesting a libation. Her left hand holds a lotus. Her feet rest on a stool and the toes of her shoes turn up in a complete circle.

Possibly this is a divinity in whose honor the ceremonies recorded here were celebrated, for towards this being all adjacent figures turn their faces. We have here a procession which reminds us of that at Boghaz-keui. The figures are badly defaced, but enough remains to show that the clans or tribes who once lived here were neither Egyptian, Assyrian nor Greek.

Of the many figures on these loose rocks, one de-

mands special attention. It is an eagle with two heads, and a rabbit in each one of his talons. Above it, nothing now remains except a foot, and the bottom of a trailing robe. We saw a similar figure at Boghaz-keui. This emblem did not disappear with the final conquest and annihilation of its inventors ; for Arab tradition describes a mythological eagle called the "Hanca," and on coins of the Turcoman princes, as early as the 13th century, A.D. we find this same emblem. Moreover, in the 14th century, this doubleheaded eagle was on the standard of the western emperors, and later still was adopted as the ensign of Austria and of Russia. Thus comes down to our time from an Asiatic culture of the highest antiquity a symbol, whose original meaning we may not divine, but which, by a strange turn of fortune, confronts the Turks at Belgrade and Lepanto, though it was this very eagle which triumphantly led their predecessors to the banks of the Euphrates, and, perhaps, to the Bosphorus. The Greeks called this region *Pteria* from *pterón* "winged." Was this name given with reference to the spread wings on the standards of the people?

Before leaving *Pteria*, notice that *some* of the salient features of these relics are found elsewhere. The helmets and doubleheaded axes were common from Chaldea to Persepolis ; the winged globe, Ionian columns, *crux ansata* and sphinxes are Egyptian. Yet it may not be necessary either to affirm or to deny that these imitations prove intercourse between the clans dwelling in *Pteria*, and the nations in the valleys of the Nile and the Euphrates.

Three hours ride from Eyuk brings us to the village

of Aladja. It occupies the centre of a plain watered by an affluent of the Iris. It is a two hours climb from here to a grassy mound called Sherdek-kai-asi, on the summit of which is a remarkable tomb cut in the solid rock. 9

Facing the east is a portico formed of three thick short columns, which, except for the bases, would be Doric. On each side is a funerary chamber. The window, its frame-work and pediment, and the general appearance, lead us to believe that this monument belongs to the very earliest period of Greek art.

Turning now our course south-easterly, down the valley of the Sangerios, 112 miles from Boghaz-keui, we come upon the fragments of a strong little fort—now called Ghiaur Kalesi—"the fort of the infidels." In the limestone rocks are two colossal figures, in relief, facing the west. They wear long beards, short doublets, girdles, shoes with upturned toes, and pointed hats. In attitude, movement and costume they have the same characteristics as other Hittite figures.

From here it is an eight hours ride to the fountain called Eflatoûn-bounar, "the fountain of Plato." Why thus called is not known. Here is a façade of fourteen stones of reddish brown trachyte. Here is a lion in high relief, in company with other animals, suggesting a frieze, like that at the Parthenon. A pair of outstretched wings hovers over other figures, human beings, standing and holding their arms aloft. One, on the left of the centre, wears the high pointed hat. These figures may be demons, whose gestures were designed to frighten away the profane; or this structure may have been a *temple* to the God of the fountain whose gushing

waters fertilize the plain ; or it may have been a dam. The work shows originality, but the want of artistic skill. This monument was visited in 1884 by the Wolfe Expedition.

Still further south, at the foot of a mountain belonging to the Cilician Taurus is the village of Ivreez. Abundant streams rush down in torrents from adjacent wooded heights, and the region is rich in gardens and orchards. The monument we have come to study consists of two colossal figures. The subject is evidently homage paid to a God by priest or king. The God is the author of fecundity, the local God of corn and wine. In his left hand is a sheaf of wheat and bearded corn. He is clad in the simple garb of a peasant, with the conical tiara and horns, the emblem of force. The artist has succeeded in giving him a cheerful expression.

The priest or king must, of course, be smaller than the deity he worships, but he atones for this misfortune by the greater richness of his costume. Besides the Jewish *features*, this monument differs from all others on Hittite ground. Yet the inscriptions are Hittite. The work may not be so old as those we have seen, but this may prove that the same system of writing was used through a long period, and perhaps for different idioms and languages.

Thus far we have studied the Hittite monuments in Cappadocia and Phrygia, a part of the ancient Anatolia, a district which we *call* Hittite, only because of the Hittite characteristics of its numerous monuments. To find monuments which we know are Hittite, because in the country where the Egyptian and Assyrian armies

made war on Hittites, we must turn our footsteps eastward. We shall cross the Taurus range, passing through the "gates of Cilicia," famous for having been revealed to the younger Cyrus by the wife of a native prince, whom he had seduced. Coming into the beautiful Plain of Adana, we are tempted to tarry at Tarsus, the home of Paul's boyhood, but the Hittite seal found there is in the British museum; the white marble sarcophagus containing the bones of its Tarsus owner is in the New York Metropolitan Museum of Art; and the Hittite ruins in the neighboring DeN-nü-tück, though extensive, furnish no new data. We pass out through the southwestern iron gateway of Tarsus; wend our way through Adana and Messis, the ancient Mopsuestia, named for Mopsus, one of the Argonauts, and celebrated as the See where Theodore taught the heresy, that Christ came to deliver man from an imperfect not a ruined, nature, and that eternal punishment is therefore impossible. Ascending the valley of the Pyramus to Ghiaur Dagh we come to Sindjirli, where an American traveller was the first to report the existence of several slabs which once decorated a Hittite palace. These blocks helped to form two sides of a room. Three slabs were on the left, four on the right. The pictures represent the Hittites as short and stout, with prominent noses and retreating chins. The second figure from the left is bare-headed, carries a bow in the usual Hittite fashion, and has boots with toes that turn up. The third figure wears sandals, a close fitting cap, a long robe, with short sleeves, fringed at the bottom and fastened with girdles. Another slab was probably placed at the gateway as a warning to tramps. The figure on it looks wicked enough to be the Hittite

devil. These rude sculptures represent the North Syrian school of art, at an early period, and are therefore of great archaeological interest.

Fifteen miles north is the ancient Germanica, the modern Marash. Among the many Hittite monuments found here, deservedly famous, are two lions. The one inscribed is at Constantinople, the other uninscribed still stands on the wall of the fortress. These lions are in the same style as those we saw at Eyuk. As we descend the plain a hundred miles long from Marash to Antioch, we shall be struck with the ample evidence that the civilization which had force enough to push through the gorges and defiles of the Amanus and the Taurus, was not idle in its home between the Orontes and the Euphrates. Artificial mounds, the sites of old forts, of large cities and of small ones, are so near together, and so *arranged*, that no one mound is out of sight of another. It was always possible to keep up a chain of communication from Aleppo to the Euphrates, and from the Euphrates across the plain of Adana. In case of an invasion the advance of an enemy could be telegraphed by beacon fires for hundreds of miles.

In 1872 Mr. Drake published in his "Unexplored Syria," the fac-simile of an inscription found at Aleppo. The following year Mons. Clermont-Ganneau published another copy. These copies did not agree. While scholars were preparing to take a cast of the stone the natives destroyed it. The revision made furnishes still another witness to the similar characteristics of Hittite writing. The stone had been much worn by natives who had rubbed their eyes against it with the hope of curing their ophthalmia.

We approach Djerablus, or Jerabis, the ancient Carchemish, where were the best known specimens of Hittite writing. A lion found here with two divinities standing on his back, shows identically the same treatment of hair as that of the Hyksos Sphinxes. Other sculptures at Carchemish, of great size, giving new views of Asiatic art, are now lying in the trenches. We have no casts of them, no photographs, but they are said to show Egyptian and Assyrian influence as well as native inventive power. About fifteen basaltic slabs, besides numerous fragments, all of acknowledged origin, have been carried from here to the British Museum. The inscriptions are in raised letters, arranged in horizontal rows, separated by raised lines, about four inches apart. The longest inscription is found on the curved surface of a stone. It was first noticed and copied by the lamented George Smith. Many of its characters are quaint and unlike those found elsewhere. On the flat side of this stone is the broken image of a priest or king. His long striped robe was doubtless admired when new, and the bands across the breast with roselike figures, must have created a sensation.

Four stones found at Hamath, now removed to Constantinople, disclose the same characteristic hieroglyphics. Their removal from Hamath was accomplished with difficulty, because some of them were built into walls, and because the natives believe that one at least possesses magic healing power. The catholic spirit of the Moslems is seen in their admission that, for a small fee, their healing stone would be as efficacious to a heretic, calling on St. George, or on the Holy Virgin, as to the faithful follower of the Meccan prophet.

Only within the last twelve or fifteen years have men begun to ask what these strange characters mean. In 1872 Hyde Clarke first suggested that they were alphabetic rather than syllabic, and guessed they might be analogous to the Himyaritic, but of greater antiquity.

The same year Dunbar Heath was certain he had discovered in them strong Egyptian analogies, and had even found the names of Amenophis I. and of Thothmes III. Eight years afterwards he abandoned his Egyptian theory and was equally certain that the dialect was fair Chaldean.

What Prof. A. H. Sayce calls the "Boss of Tarkondemos," is a silver cup of the size and shape of half a small orange. It represents a warrior in form and costume, arm and leg, sword and hilt, for all the world like the figures we have seen at Karabel, Boghaz Keui, Eyuk, and Ghiaur-Kalesi. A row of cuneiform characters is in the disk and clearly enough Hittite letters in the field. Mr. Sayce believed that he had found a bilingual monument—a genuine Hittite Rosetta stone. The cuneiform legend was easily read :

"Tarrik-timme, King of the Country of Erme."

In the Hittite characters he reads the same legend. With this key thus obtained he attacks other Hittite texts, and publishes a list of thirty-one characters with the supposed meaning of each. He thinks he recognizes the Mongolian type, the agglutinative character of the Hittite language, compares the Hittite with the recently discovered Vannic characters, and claims the honor of the discovery that in the Cypriote emblems we have the hieratic forms of the Hittite emblems. In the *Academy*

of the 19th of January, 1889, Mr. Sayce suggests that the language of a greater part of the Tel-el-Armana tablets belongs to some Hittite dialect.

The Rev. Charles J. Ball seems to waver between the theory of Semitic and of Aryan, or rather of Scythico-Iranian analogies. His patient, careful study has, indeed, given us no new translations, except those of a few proper names, but he confirms the suggestion previously made, that the inscriptions are to be read like Egyptian towards the faces of the living beings; that the characters are partly ideographic, partly phonetic and often redundant. He recognizes the indebtedness of scholars to Dr. Wm. Hayes Ward for the suggestion that the lines are to be read in the *boustrophedon* method, as the ox ploughs.

Capt C. R. Conder has written voluminously on this whole subject, has suggested numerous theories, but aside from the interest he may have inspired in the study of the Hittite monuments, it is difficult to say what he has accomplished. Fanciful analogies with Basque, Magyar, Finnic, and Ugrio-Iranian dialects do not solve the mystery of the Hittite inscriptions.

Prof. John Campbell, of Montreal, endeavors to establish the existence of a family of languages which he calls Khetan. This includes the Basque, Caucasian, many Siberian dialects, and the Japanese, Dakotan, Iroquois, Choctaw-Maskoka and Aztec tongues. He then finds the literary remains of this great Khetan family not only in Asia Minor and Etruria, but in Northern India, in Siberia, in Japan, in Mexico and elsewhere. There is not only a unity, he says, in these Khetan languages, but a unity also in their graphic systems. Dis-

tance in space and time separating Hittite and Aztec hieroglyphic systems is nothing. They are one for all that. The Corean alphabet and the Cypriote syllabary both unlock the mystery and prove the unity of Hittite and Aztec hieroglyphics. It is hoped that his book, soon to appear, giving to the world a translation of all the principal Hittite texts, will make everything plain.

Among others who have earned the grateful acknowledgement of scholars are Prof. Ramsay of Aberdeen, Prof. Golenischeff of St. Petersburg, Mr. Thomas Tyler, and Mr. Theodore G. Pinches of London, and last, though not least, Prof. Francis Brown, D.D., of Union Theological Seminary, New York. His article in the *Presbyterian Review*, for 1886, is a masterly production.

Respecting the religion of the Hittites the Bible is silent. We receive our first clue to some of its features from the treaty between Ramses II. and the Khitan King, Khita-sar. The treaty says that Ra is the chief god of the Egyptians, Sutek (~~the chief~~) the chief god of the Khita. Ten Hittite cities are named in the treaty, of each one of which it is said: "Sutek is its god." In harmony with this the Hyksos monuments of Avaris inform us that Set or Sutek was the god of the Shepherd Kings long before their migration to Egypt. The first king of the XVth dynasty bore the name Set-Pehati, *i. e.* "Set the Powerful," sometimes Nubti, *i. e.* "Set the Golden," or "the Resplendent"; whichever of these two ways his name was spelled, the determinative following it was always the well-known image of Set—a jackass with his tail erect.

He was *not* originally the emblem of evil, but was a

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sun-god, *i. e.* one form of the great life-giving power in nature ; Osiris was his brother, Nephthys, the sister of Isis, was his wife. The Tablet of San-Tanis, engraved in the time of Ramses II., calls Set "the son of Nut, the mighty god in the bark of millions," the very title by which Ra himself was called. He was also represented as sitting or standing on the highest point of the bark of Ra, and was called "the Lord of Life." All this does not imply that Set was the only Hyksos or Hittite god, for their monuments also speak with reverence of Ra and of Horus, but Set was certainly *one* of their gods from the earliest time. That he was their chief god appears from the Papyrus Sallier I., which says that "Apepi (now supposed to be the Pharaoh who elevated Joseph to office) chose Set for his god and built to his honor, at Ha-uer, a costly and an enduring temple." This may mean that Apepi made the fact conspicuous that Set was his *god*. Perhaps he was the first to identify the Hyksos Set with the Egyptian Set.

Set seems to have been only another name for the Egyptian Bār or Bāru, the Canaanite Baal, the proprietor and lord of all things, the emblem of productive power. Therefore, in the poem of Pentaur, when Ramses II. is represented as slaying the Hittites right and left, they cry out : "It is no *human* being that is in him : It is Sutech, the mighty Sutech, the son of Nūt. Bār is in his limbs."

It was only after the expulsion of the Hyksos that the Egyptians associated Set with their enemies, and began to regard him as the personification of evil, the emblem of darkness and night. Then an infuriated

persecution burst forth against him, and his image was mutilated on all the monuments. Then he became a wicked demon, and in the Book of the Dead is represented as a flame, the tormentor of souls.

Thus the Hittites, like the other nations of their time, stood in fear of that occult power whose heat they felt in the sun, and whose angry voice they heard in the thunder, but who was to them a mystery. This sensual religion had little or no influence over the moral life. In *all* the ancient religions the 125th chapter of the Book of the Dead stands alone in giving emphasis to private virtues. Yet even *this* chapter is full enough of demonology and magic formulas.

Doubtless the debate will continue to be waged around the question: Whether the monuments of Lydia, of Phrygia, of Cappadocia and of Northern Syria, especially the hieroglyphic inscriptions, are all to be regarded as Hittite? They are so regarded:

1. Because of their undoubted likeness in many characteristic features.
2. Because, it is said, no other people has shown the power or the culture needful for the construction of such monuments.
3. Because, even if the monuments of Northern and Western Asia Minor were not the work of permanent residents, but of successful invaders (though this is not supposable of Boghaz-keui or of Eyuk), yet the Hittite army was the only one of which we have any knowledge strong enough to make that invasion.
4. Because the Egyptian inscriptions of the XIXth dynasty show that there was a close connection between the Khita and the tribes of Western Asia Minor. The

Khita were aided against Ramses II. by the Dardani-ans, Mysians and Lycians.

It is objected that the Bible, the Egyptian and the cuneiform texts all agree that the Hittites dwelt between the Euphrates and the Orontes, that Carchemish was the home of their king; that no monuments speak of Hittites elsewhere, neither does Herodotus nor any other ancient writer.

To this it is replied that Homer, (Od. xi., 521) refers to the Kēteioi, as well known warriors, the slaughter of whose chief was the crowning glory of Achilles; that in Josh. i., 4, it is said that the land of the Hittites extended from the Euphrates to the Great Sea, that mention is made of the kings of the Hittites and of "all the kings of the Hittites," as though there were known to be several contemporaneous Hittite monarchs. We know moreover that the Khita on the Orontes led in their train tribes more or less closely related, whether independent or confederate, whether dwelling in Northern Syria, in Cappadocia or in Phrygia we may not be able to say. Mr. Wright entitles his book: "The Empire of the Hittites." Such an Empire as that of China or of Russia, certainly the Hittites had not.

To the further objection that the tendency in the north was towards architecture, in Syria towards plastic art, and that the Cappadocians were more skilful than their supposed masters of North Syria, we have only to remind ourselves that climate and scenery have an influence on art which we cannot explain. The Greek artists were superior both to their teachers and to their pupils.

Possibly Hittite may not be the most scientific word

to express the parentage of these newly found monuments, possibly Anatolian, or Lydo-Phrygian may be better, but that there are points of resemblance between the sculptures, reliefs and written characters of ancient Anatolia and of Syria beyond what can possibly be regarded as the effect of accident or of borrowing, an agreement much closer than with either Assyrian or Egyptian, is unquestioned. That a system of writing by pictures should be invented three times, within narrow limits, that is, in Egypt, in Babylon and in Asia Minor, is no more incredible than that it be invented twice. From Karabel to Eyuk and from Eyuk to Hamath, the language seems to be essentially one. The material of which the words are formed is one. Nothing but community of linguistic tradition can explain such a phenomenon.

At that remote period during the XVth and XVIth centuries before our era—when the dawn of history was just beginning to glimmer, to what other nation can we point comparable to the masters of Hamath and of Carchemish? What other people was compact and strongly enough established, to hold in check the best efforts of Egyptian valor, prestige and discipline? Those who could form a union strong enough to hold at bay the everywhere victorious Thebans, ought to have had those mental resources which the creation of a written language supposes. Who is it that has no interest in the art, the skill, the character of that energetic, valiant people, just merging into the light of history? Who has no inquiries to make respecting the books they wrote, the records they kept, the songs they sung, the hopes they cherished?

On this whole subject the one thing we want is more light. It is hardly fair to say that we have nothing to offer but conjecture. The monuments we have are facts. Their remarkable similarity is a significant fact. Why disparage conjecture? How was the Rosetta stone deciphered but by trying conjecture after conjecture? How was any puzzle ever solved but by a lucky conjecture? Hundreds of monuments, bearing the same characteristic features which we have seen exemplified are sleeping beneath the soil of Northern Syria and of Asia Minor, waiting for the touch of a spade and for the genius of a Champollion. Science waits, art and literature wait for some "Wolfe expedition" to be sent to Eyuk, for instance, with orders not to return, until its hidden treasures shall see the day; and through more extensive comparisons and collections conjecture and theory be converted into positive proof. To American enterprise, generosity and scholarship may the honor be given of Hittite discoveries, certain and ~~sure~~ to be made!

soon

THE PORTUGUESE IN THE TRACK OF COLUMBUS.

BY

DR. P. J. J. VALENTINI.

VI.

NAMES OF PARTICULAR INTEREST.

Because they are expressed in clear and distinct letters the reading of the twenty-two names hitherto discussed presented no difficulties. Much the greater portion of them was susceptible of interpretation and found to be derived from impressions and incidents which the navigators received and noted down.

Among these twenty-two names, however, there are some which are worthy of still closer discussion, because it seems probable that they may be brought into a most effective relation to the substance of the expedition itself, and may, therefore, contribute to the solution of our problem. We mean the two proper names of *Martinho* and *Don Diego*.

With regard to the name *Martinho* attention must be called to the fact that it was not meant for the saint in the calendar, and that, consequently, it was not intended to note the day of discovery. We have not to deal with a San Martinho, but evidently with a Don Martinho, with the proper name, therefore, of a person well known to the mariners, a man whose memory they wished to preserve, and to whom, for reasons

of their own, they particularly desired to do honor at this time.

If we look to Portugal and to a man then living who bore this name and deserved such a commemorative distinction, it is but natural that we should be reminded of *Don Martin de Noronha*, the cavalier of honor so often mentioned by Columbus. It was Martin de Noronha who, by the order of King Joam, came to Lisbon to tender the royal invitation to Columbus; it was he who presented him at court in Val de Paraíso; he it was who in all Columbus's movements remained by his side as an obliging and watchful companion. These facts alone would suffice to prove that Don Martinho was a person of the highest distinction; and when we come to examine the Portuguese records, we find that his ancestors had for generation after generation been invested with the highest dignities of the kingdom, and that these were still held by members of his family in the time of Columbus. The Noronhas were blood relations of King Joam. Their ancestor, Don Alfonso, a Conde de Gijon y Noronha and son of King Henrique II of Castile, had been married in 1378 to Isabel, the daughter of King Fernando de Portugal. What particular rank Don Martin occupied at the king's court the Book of the Grandees* does not tell. It states only that Don Martin became the founder of a new line of his illustrious family, that of Angeja, which is still flourishing to-day.

In like manner it will be easy to bring the other proper name, that of *Don Diego*, into connection with

* See Gaetano de Sousa, *Memorias hist. e genealog : Dos Grandes de Portugal, Lisboa, 1755, page 83.* Genealogical hist. of the Noronhas.

that person in whose palace Columbus after his first audience was invited to pass the night, *Don Diego de Almeida*, the rich prior of Crato of the Order of St. John, the chief master of the royal hounds and castellan of Torres Novas.* The people knew him as a kindly gentleman and the king's intimate friend. The glory of his family dated from the day on which his ancestor, Payo Gutierrez, in the reign of King Sancho I. had taken from the Moors the stronghold of Almeida. Don Diego was also the brother of Don Fernando, the admiral, who at the time of Columbus's return from the West was waiting in Madeira with a fleet for orders to start on an expedition. Finally, that both Don Martinho and Don Diego must have stood in high estimation with the king is clearly shown by the circumstance that we find their names among those of the four witnesses who signed King Joam's testament.† When, therefore, an opportunity presented itself for erecting a flattering memorial on this far-off western coast to persons of distinction connected in a certain way with its discovery, the names of these two grandees must have suggested themselves before any others.

In connection with these two names another strange circumstance is worthy of mention. We find the names of the two courtiers wanting on the three maps of later date than that of Cantino. Neither Ruysch nor the Ptolemy of 1513 gives the names of Don Martinho and Don Diego, while Schoener has that of Don Diego but omits Martinho. We know that King René of Lor-

* *The same*, page 266, that of the *Almeidas*.

† *Provas d. l. Hist. gen. da Casa Real Portuguesa*, by the same, Lisboa, 1742, Tom. II, pag. 175.

raïne, who liberally contributed the great expenses for the editions of Ptolemy of 1508 and 1513, had received copies of a Portuguese marine chart through the agency of Amerigo Vespucci. Is it not possible that this busybody of a geographer, who stood under great obligations to the crown of Portugal, took care to suppress these two names? May they not even have been erased from the original map which is said to have decorated King Emanuel's study? It is not difficult to understand that it might have been wished to destroy everything connected with that ugly affair of 1493, and that the two grandees might have thought it unbecoming to have their names paraded on the chart. It is unnecessary, perhaps, to dwell upon these natural suspicions, when we take into account the errors traceable to copyists, with their disposition to spare themselves labor and time, even at the expense of correctness.

Besides these two Portuguese proper names two others inscribed on this tract of coast, *Coruejo* and *Canfuze*, attract our attention. As already said they defy translation. The spelling of them differs on the three later charts, and this suggests that the copyists must have found great difficulty in interpreting the reading of the original charts. The names are conspicuous also for their lack of qualifying words such as *rio*, *golfo*, *cabo* or *punta*. On all these grounds taken together, as already observed, it seemed best to look upon them as words or names expressed in the Portuguese language, but picked up from the mouth of the indigenous people of this coast.

As to the word *coruejo* or *cornejo* let us say at once that we do not see in it the word *Conil* proposed in-

geniously enough by two eminent geographers.* It will be learned from the quotation below, that both these writers concur in the opinion, well grounded and clearly set forth, that the representation of this coast, as given by Ruysch and his followers, is nothing else than the continuation of the coast of Darien and Honduras, and that it presents, therefore, in a manner the outline of the peninsula of Yucatan; an opinion, which with us has ripened into a firm conviction. Humboldt and D'Avezac had not, as we at this day have, the good fortune to be able to consult the original copy of the three often named editors. They followed Schoener's (1520) suggestive spelling of *coniello* and on the ground that all subsequent maps, up to this day, show at the corresponding place the name of *Conil*, they quite naturally inclined to merge the one name in the other. Although the detection of a name, apparently of native origin, would eminently suit the purposes we have in view, there are strong

* A. v. Humboldt, *Examen crit. d. l. géogr. d. Nouv. Continent, Paris, 1837, Tom. II, page 6*, and the same, *Relation historique, Tom. II. p. 706*.—Mr. d'Avezac, *Les Voyages d'Améric Vespuce, in Bull. d. l. Soc. d. Géographie, Paris 1858, Tome 16, page 182*: "Peut-être même encore le mot de *Coniello* est-il une altération sous laquelle se laisserait deviner le nom actuel de *Conil*, entre le Cap Catoche et le rio de Lagartos." On the same page: "mais où nous ne saurions voir, avec A. v. Humboldt, que la presque île de Yucatan."—Schoener's globe, 1520, was the last that gave the coast west of Cuba the long-stretched form as represented in the Portuguese chart. Later on, (after 1520), all the charts begin to show the body of Yucatan in its genuine peninsular shape, and to put the names of *Conil*, *rio de lagartos*, *punta delgada*, *Campeche* and *cabo del incontro (pelea)* in the places and in the succession in which we read them on the Portuguese chart. This fact alone, even if other evidence were wanting, would suffice to prove that the later Spanish navigators were guided by good copies of the Portuguese Marine map, showing on its face the triangular form of the peninsula. As to *Conil*, we entertain grave doubts of its being a native name. No place or village of this name is found nor does any tradition point to its existence on the soil of Yucatan. We rather think the name was given by the Portuguese mariners to this spot on account of some peculiar feature resembling port Conil on the other side of the ocean.

reasons to keep us back from falling into line with the two savants. We argue that if the first explorers had met at this place with a settlement called *Conil*, they would have put it on paper in this form, whereas each of the four readings gives it an additional ending of respectively: *ejo* (*eyo*) *eo*, *tiello* and *iello*. If any emendation of the word *cornejo* is to be risked, these syllables must be taken into account. If we suppose that the little dot or tail beneath the *z* has been omitted [r g] so as to change *r* into its graphic cognate *x*, the word as first written must have been *Coxmeyo*, and this we take to be a form of *Cozumello*, which is the name of the large island of *Cozumel* not far east of *Conil* of to-day. Its spelling on non-Spanish maps in the 16th century was *Cotzamello*, *Cotzamillo*. The word is probably derived from *cotz*- fowl, *a*-water, and *molay*-reunion, assemblage; hence "gathering of water fowls."* It is well known that this island formed the portal of the discovery and conquest of Yucatan as of Mexico. The Spanish captains Hernandez de Cordova, Grijalva, Cortes and Montejo, all of them made their landing there before setting their foot on the continent. Its pyramid with the white temple upon it was seen "glistening like a silver pharos far out to sea," and could not possibly have escaped the prying eyes of the captain of King Joam's fleet. The inscription on our map is placed behind cape *do fim de Abrill*. Not so the Ptolemy

* ('Waterfowls.') Whenever we have an opportunity to remind the student of J. Lloyd Stephens, of his work accomplished in Yucatan, and of the incomparable correctness and beauty of diction in which he clothed the report of it, we do so with the sincerest sentiment of admiration and gratitude. Read his visit to the island of Cozumel, that "resting place of immense flocks of birds" in *Incidents of Travel in Yucatan*, Vol. II, page 410.

of 1513 and Schoener, which represent it in the form of a large island connected with the cape, and with its name written right on its face.

The other name which is not translatable and which for reasons given we must suppose to be a word of native origin is that of *Canfuze*. Ruysch left the word out, and both the Ptolemy of 1513 and Schoener show it with the spelling of *Caninor*. As our map must always be considered to have the names more correctly spelled, we pass by the later form and try what can be made out of *Canfuze*. Here we observe that the letter which at first sight seems to be an *f* cannot upon closer inspection be so read. If compared with all the other *f*'s that occur on the map it is found to lack the characteristic flag-dash. If then we join the first stroke of the next letter *u* to the imperfect *f* we get the letter *p*, and with this emendation we come to a word carrying the sound of *canpize*, *kan-pech* in the native language, or Campeche as the large part of Western-Yucatan was afterwards called by the Spaniards. History tells us of the bloody encounters which on each attempt to land at Campeche Cordova as well as Grijalva and Cortes* had with the warlike cacique *kin-pech* (yellow-tick); and that the Portuguese met with similar opposition at this place appears to be clearly suggested by the name that follows the word *canpize*, which is *cabo d. li cōtu*, a somewhat abridged corruption of *cabo del incontro*, later on put down on the charts in the Spanish version as *Cabo de pelea*,

* Itinerario de Grijalva, in Coleccion de documentos p. l. historia de Mexico, by J. Garcia de Icazbalceta, Mexico, 1858, Tom. I, pages 291 and 292.—Bernal Diaz del Castillo, Hist. verd. d. l. conq. d. l. Nueva España, Madrid, 1632, Cap. 3 and 4 and Cap. 30 and 31.

which means the same thing. The identity of both place and name will be still more emphasized when we remember the fact that no river or creek empties into the sea on the whole way from Conil down to Campeche, and that the latter is the first spot at which fresh water is again to be had. It was just the necessity of having the empty casks filled with fresh water that gave importance to this spot and made it remarkable to the first navigators and discoverers.

But, it may be asked at this point, how does it come to pass that if the peninsula of Yucatan is meant to be represented by this long-stretched southern coast, the port of Campeche appears in latitude about 50° north of the equator, whereas its true position is in 20° N. Lat. and on the west coast of a three-sided peninsula? Our answer is that we do not believe King Joam's officers would have been bold enough to present him with the image of a disfigured survey, nor that the first copyist found the distorted outline on the Royal Marine Chart, nor finally that there is any truth in the suggestion oftentimes made that this coast is the representation of the eastern shores of North America; for if this were the case, the *cabo do fim de Abrill* would point its finger toward the island of Habacoa and would not stand directly west of the Cuban cape of San Antonio. No; we are of the firm belief that whenever tampering or deliberate misrepresentation is to be presumed, it must be laid at the door of the man who copied the chart and the responsibility for it must not be charged upon those experts who first surveyed this coast west of the island of Cuba.

When we consider the possible motive for this ex-

traordinary disfigurement, the choice lies between two explanations: either the draughtsman was expressly ordered to deliver the copy of the chart just in this prescribed form, or he drew it on his own authority for personal convenience.

There are reasons at hand which speak in favor of the first assumption. The expedition had been made at great expense and risk. The facts with regard to it were a part of the national record and the knowledge of it could not well be blotted out of existence. Similar considerations must have worked for the preservation of the chart. To destroy it would have been a vandalism and yet to keep this most precious document so well concealed that it should never come to light was very rightly deemed to be merely impossible. One resource there was: the chart might be so drawn as to mislead the intending copyist and the configuration of the coasts could be distorted to such a degree as to remain unintelligible except to those who possessed the key.

The second assumption that the copyist acted on his own authority seems to be the more acceptable one and to be based upon grounds of a less artificial character. It is more natural that reasons of economy prevailed with him. If he had drawn the body of the peninsula in the proportions given to him and at a distance of about 20 or 25 leagues from the Cape of San Antonio, he would have needed a sheet of paper or vellum much larger than any he had at his disposal. We should be glad to learn of any other imaginable reason for the disfigurement. But whatever the reason may have been, the fact is beyond dispute that the contours of the

peninsula in the original map were straightened out. We are able to follow the performance, step by step, and in this way to reconstruct, with a fair measure of accuracy, the body of the peninsula as it was originally drawn on the Royal Marine Map.

For this purpose let us take a piece of tracing paper and begin tracing the outlines from the *rio de las parmas* round *cabo do fim de Abrill* till we arrive at the *cabo Santo*. Here we stop and set the portion of the coast that follows at a right angle to the cape and trace it so. By this operation three sides of the coast are obtained. The next operation will be to give the diagram, at a measured distance from the cape of San Antonio, a quarter turn so that Cantino's south coast becomes the east coast of the peninsula. If now we look for *canpice* or Campeche, we shall find it at the place where it ought to stand on every chart of Yucatan and where consequently it must have been placed by the first surveyors, not in 50° but in 20° N. Lat. and on the west side of the peninsula.

There is an additional point that bears testimony to the correctness of our theory. All the names inscribed on the straightened coast exhibit themselves in a position contrary to what we should expect. They all stand upside down. This obvious anomaly has now found correction, because by bending the line into a peninsular body and by bringing this body into its natural position with regard to Cuba, the inscriptions also have been restored to their natural position. We find the names on the west coast, from *canpize* to *cabo Santo*, standing horizontally and upright, and those on the north coast, from *cabo Santo* to *cabo do fim de Abrill*, standing verti-

cally and upright, just as an expert draughtsman would have put them.

VII.

IDENTIFICATIONS.

A definite solution of our problem is arrived at when we see before us the evidence that the reconstructed chart not only bears all the characteristics proper to the physical features of Yucatan with its three coasts, but presents them all in their natural order of succession.

To facilitate the comparison, the map shows, side by side, the Portuguese chart and the modern chart of Yucatan.

Some allowances must be made. The ancient map will be found defective in a certain degree with regard to measurement and relative proportions. It will be found that some peculiarities of the coast which excited the sailor's interest are rendered in disproportionate dimensions, while others not so significant are treated, as happens in all first surveys, with less attention.

Let us look, first, at the islands that skirt the eastern coast.

Beginning at the south we meet on the Cantino chart a large number of islands grouped near the coast. These were undoubtedly intended to represent all those islands which on the modern map are seen stretching from the island of *Tabaco* (Glover reef) upward to *Bacalar*, and parallel to the coast now known by the name of *Balize*. Farther up, beneath the *cabo do fim de Abrill*, is a large island painted in violet color and standing drawn at a proportionate distance from the coast. This can be no other than the famous *Cozumel*. The marks for reefs

and shoals near by the cape correspond with those little islands, to-day comprised under the collective name of *islas de las mujeres*.

As to the *bays* of the same coast the modern map shows three, all of considerable dimensions, but differing in form. The lowest one, that of *Chetumal*, which is a kind of twin bay, and cuts deep into the coast, corresponds with the one marked on the ancient chart, as *golfo baxo*, the deep gulf, its twin-nature having been noticed by the sharp-sighted explorers. The two following bays, *Espiritu Santo* and *Ascension*, are also seen on the Cantino chart, but are left without names. Of the capes on the *golfo baxo*, the one at the entrance bears on our map the name *Mortinho*, the inner one that of *lurcar*. In the first we are justified in recognizing the present cape of *Balize*, in the other the *punta de la piedra*.

The rivers *de las palmas* and *do corno*, in the south, are drawn at places where to-day we find the mouths of the *Rio hondo* and the *Monkey-river*.

Upon approaching the *cabo do fim de Abril*, of which we entertain no doubt that it was intended to represent the actual *cabo de Catoche*, the coast of the peninsula begins to trend toward the west. In order to make this important circumstance more conspicuous, the draughtsman seems to have taken care to provide this turning point with the sign of an arrow-head, a suggestion to be turned to profit in case of re-occurrence.

Let us now proceed to the examination of the north coast of Yucatan.

Its physical aspect is monotonous to the last degree. It shows a long stretch of beach, unbroken by any bay or mountain slope. For the whole distance, from east

to west, the front is bordered by the line of an unattractive wall of sand, open only at three places. In the east is the break that forms the bay of *Yalahan*, and not far west from this and connecting with it that of *Holkoben*. The third break is that known by the now obstructed *boca of Jilam* (J—ds. The sea rolls in and out of these *bocas*, and fills or empties the estuaries lying behind the wall. Notwithstanding the continuous motion of the tides these estuaries are of smooth water, and as they run parallel to the beach they afford safe anchorage and a welcome means of inner navigation to the small craft of the native boatmen. Seen from on board a vessel, out at sea, these breaks present the aspect of mouths of rivers, and this impression must have led the Portuguese navigators to give to the two neighboring breaks that form the bay of *Yalahan*, the collective name of *Rio de dô Diego*, while the break at *Jilam* received the name *Rio de las almadias*.

Between these two breaks or rivers on the north coast, our ancient chart names only two capes, *cabo delgado* and *punta roixa*. In reality, they have nothing of a conspicuous promontory. They are rather big natural jetties of sand protruding from the beach into the ocean, but not without significance to coasting ships, because they are the only landmarks along the straight and barren coast and are to be avoided on account of their shoals and the eddies originated by the deflected current. On the modern chart we find for them the names *punta Holchan* and *punta Yalkubul* (marked on the map *P.H.* and *P.Y.*).

On our modern maps the western end of the northern coast shows no salient cape. It curves smoothly to the

south, where at a certain distance the sea has again made an inroad, broad and deep, the entrance point of which to-day is called *la punta desconocida*, while the estuary itself is known by the name, *el Real de las Salinas*. It was the logic of these successive features, taken in connection with the arrow-head drawn on the Cantino chart by the copyist, that suggested the bending of the coast line at this place in order to obtain the genuine shape of the peninsula. By doing this we restore the *rio de los lagartos* to its natural direction, which is from the south to the north, and are thus enabled to identify this supposed river with the estuary *de las Salinas* and the *Cabo Santo* with *punta desconocida*. To the south of *punta desconocida* the modern maps give to this tract of the west coast the name *bocas de Chizahcab* (*transl.* strong-water-push). These *bocas* or breaks undoubtedly answer to those which at the same place on the Cantino chart are called *las Cabras*, or better, *las abras*, *i.e.*, openings, and that we are correct in our demonstration is shown by the circumstance that opposite these *abras* the chart has the mark for a reef, which in location, distance, and loneliness exactly corresponds to the *la Piedra Island* of the modern maps.*

These small *bocas* are followed by two larger ones, the names of which are given in the modern maps as *boca de Xaina* and *Lumpolol*. Both these interesting features were observed by the ancient pilots. The first one is left without a name, the other bears that of *Lago luncor*.

Down to this point the eye of the navigator is fatigued

*A visit has been lately made to this little island by Mr. Désiré Charnay, the industrious explorer of Yucatan. See for description and illustrations: *Le Tour du Monde*, Paris, 1887, Vol. 53, Page 320.

by the melancholy aspect of a barren coast, but as Campeche is neared there begins to appear in the distance like a blue cloud rising from the ground a range of soft rolling hills, at the foot of one of which nestles the city of Campeche. This sudden change of landscape has found expression in the name *costa alta*, left to this region. After a few hours' further sailing the hills come closer and closer to the water, no intervening strip of level land is left; the dark form of a hill about 420 feet in height rises on the very brink of the waves, like a lofty citadel, commanding the beach as well as the approach from the sea. This conspicuous promontory, *punta Seiba* or *punta de los morros* of to-day, must have been in some way of good augury to our Portuguese, for they gave it the name of *Cabo de boa ventura*. The river farther to the south is the *Champoton*. At its mouth it is dull and almost stagnant, for it has no perceptible current, but its area of drainage extends as far as to the very centre of the peninsula. At the time of the Conquest it furnished in this land of drought the means of life to a dense population.* The Spaniards vainly endeavored to take possession of this artery of life and settle down in Champoton. They had to yield to the unceasing onslaughts of the formidable Canpice, *Kin-Pech* (yellow-tick) and his tribe, and to change the much-desired site of a well-watered harbor at Champoton for that of Campeche, further north. It seems as though these first Portuguese explorers had met further on with similar resistance.

* Scenery and incidents at Champoton are described in a lively manner by *Bernal Diaz*, the companion of Grijalva and Cortes, in his *Hist. verd. d. l. Conq. d. l. N. Esp.* Chapters 3, 4, 5. On the same read also *Eligio Ancona*, *Hist. de Yucatan*, Merida, 1878, Vol. I., from page 209—324.

When they reached *punta Jovinal*, a little to the south, they named the spot *cabo del incontro*, to record an encounter with the people of *Kin-pech*.

The inscription *Costa del mar vaçano* (oceano) being the last met with on the map, we are to suppose that the explorers did not further pursue their course, and here turned back.

Not one of the physical features that characterize the three coasts of the peninsula of Yucatan escaped the attention of the Portuguese pilots.

FINAL REMARKS.

The sudden rise of Portugal at the beginning of the XVIth century to the foremost position as a maritime and commercial power in Europe was due to the extreme care taken by her rulers to cover with a veil of the deepest secrecy the objective points of their enterprises beyond sea, the improvements of their methods in navigation, and the results of their expeditions.

The Oceanic fleet which had been formed during the last five decades of the XVth century, might have been built and equipped and have found safe anchorage in many a port of the continental kingdom. But under such conditions every step in the preparations for a voyage would have been open to the inspection of a host of foreign speculators, merchants, agents and spies; and the Portuguese monarchs wisely established the royal navy yard in the distant Madeira. When it is considered that the communications afterwards maintained between this island and the naval station in the Bahamas not only involved a breach of treaty, but were stained also with the reproach of piratical depredations

committed on the Caribbean coast, it is not surprising that the sources of information concerning it and illustrative of our special subject should be very scanty at this day after the lapse of nearly four hundred years.

Should the official report of the admiral in command of the surveying fleet ever come to light—a thing hardly to be expected—the account of the discovery of the peninsula and the incidents connected therewith, would not differ much in substance from that given twenty or thirty years later by Cordova, Grijalva and Cortes. On the other hand even the driest historical narrative of this Portuguese expedition must glow with life and color, when touched by the imagination. We have only to bring before our mind's eye the array of all the startling occurrences that must have happened to a little fleet engaged in the task of operating stealthily under the very eyes of the enemy—the constant peril of detection, the exultation of escape, the continued strain of vigilance, the Punic rigor of discipline that weighed upon the mind and body of every man, and the stern duty of absolute silence that sealed the lips of each actor in this drama of national vengeance and political perfidy.

It seems to be the result of an almost incredible neglect that in the course of the twenty-four years since the discovery of the Antilles no Spanish vessels except those under Cordova's command (1516) attempted to steer to the west of Cuba so as to strike the continent at or near Cabo Catoche. A few days' sailing still farther to the west would have brought the seamen to a land of wealth and civilization. This lack of enterprise the Spanish nation had to pay for with the loss of a whole generation, and the burial of the bodies of her best sons along

the inhospitable shores of the Caribbean Sea. For once settled in St. Domingo, they followed the drift of exploration backward to the east, meeting on that long-drawn curve with nothing but the wilderness of stagnant mangrove swamps and the spears and poisoned arrows of the Guajiquiro Caribs and the Darien savages.

We cannot take leave of our subject without making mention of a curious circumstance connected with the Cantino chart. When we look at the left marginal line, where to the west of the *Cabo do fim de Abrill* a large cluster of islands is represented, we find that the line passes through the midst of an island and through a half-drawn indentation of the coast. That at this place something is missing in our copy which was represented on the original chart, becomes evident when we examine the three maps published in 1508, 1514 and 1520. Ruysch, as will be observed, brings out at this place a full curve and the line of the tropic of Cancer is drawn through two islands, which are inscribed *C. S. Marci*, while north at the beginning of the curve we find the name *Lago de Loro*. The same curve and islands appear still more distinctly drawn in the Ptolemy of 1514, the curve showing an additional gulf and the inscription as in Ruysch but with the spelling *lacco dell odro*. Schoener also shows the curve and the islands but drops the names, and adds to a southerly prolongation of the curve the inscription *Paria*.

Now, since we have not the slightest doubt that these three maps, as well as the Cantino, are copies taken either at first or second-hand from the original Portuguese marine chart, we must feel a measure of indignant grief at the irreparable damage done by the idle hand

that trimmed away the worn edge of the map, and so kept us from learning with precision what other inscriptions the original chart exhibited at this place. For, in one word, the piece cut off must have contained on a large scale, the representation of the coast of Northern Honduras. The *lacco dell odro** represents the modern *Golfo Dulce*, and the *Cabo St. Marci*, indicated on the three maps by islands lying in a delta, is the tract of coast which greets us in the same peculiar shape and in the same place on all the maps of the ensuing centuries, inscribed with the name *Cabo de tres puntas* (to-day cape *Manabique*) and followed by the headland of the *plains of Sula*, the alluvial product of various small and the two large rivers, the *Ulua* and the *Chamelicon*, the *triquestre* of the Vaz Dourado atlas. As far as this point the Portuguese appear to have extended their survey.

One of the results of our examination of the Cantino chart has been to learn that Portuguese skill and marine enterprise succeeded in discovering the shores of the new continent before Christopher Columbus. But it is not our purpose to view this interesting fact in this light alone or to emphasize it to the gratification of those who try to remove the Admiral from the lofty pedestal on which admiring and grateful posterity has placed and will sustain him.

Columbus was and will continue to be the man of the first and the great deed; for, as Goethe says, "a man was needed, who had the power to seize with firm and

*In translation: the bag-gulf, in Spanish *el odre*, the wine bag, made of goat-skin, in which since the appearance of the god Bacchus on the Mediterranean shores, the vintagers down to the present time have kept their wine. The name springs from the mariner's coarse imagery and perfectly reflects the contours of this gulf with its strangulated outlet into the bay of *Amatique*.

intellectual grasp all that was fable and fact, tradition and error, and to stamp these like coin into palpable reality." The Portuguese discoveries in the Castilian waters were of inglorious origin, their management and conduct and consequences had to shun the open daylight and the final result, though not without significance, was a fruitless one. We are to remember that this chart gives the first delineation, offered to European eyes, of any part of the gigantic continent. Rediscovered Yucatan afterwards received from the Spaniards the nomenclature left by the Portuguese, and we cannot doubt that when copies began to be multiplied, some one of these early charts of the peninsula served to guide Cordova, Grijalva and finally Hernan Cortes to the golden gates of Montezuma's empire.

GEOGRAPHICAL NOTES.

THE DEEP TROUGHS OF THE OCEANIC DEPRESSION.— Prof. James D. Dana, in the *American Journal of Science*, for March, 1889, discusses the subject of the deep troughs of the oceanic depression, with a general conclusion against their supposed volcanic origin. No more than this is possible, he remarks, in the absence of an accurate map of the heights and depths through all the great area. The paper is illustrated by a bathymetric map (here reproduced), with accompanying explanations. In the preparation of the map Prof. Dana used the charts of the Hydrographic Departments of the United States and Great Britain and the lists of new soundings given in German and other geographical journals.

In order that the facts on which the bathymetric lines are based may be before the reader many of the depths are given, but in an abbreviated form, 100 fathoms being made the unit; 25 signifying 2,500 fathoms or nearly (between 2,460 and 2,550); 2.3, about 230 fathoms; .4, about 40 fathoms. Only for some deep points is the depth given in full. The addition of a plus sign (+) signifies no bottom reached by the sounding.

Some divergences from other published bathymetric maps are explained. The northern half of the North Pacific is generally made part of a great 3,000 fathom





area (between 3,000 and 4,000), stretching from the long and deep trough near Japan far enough eastward to include the soundings of 3,000 fathoms, and over in mid-ocean along the 35th parallel. Prof. Dana thinks it more reasonable to confine the deep-sea area off Japan to the border-region of the ocean, near the Kurile and Aleutian Islands, and leave the area in mid-ocean to be enlarged as more soundings shall be obtained.

Again, in the South Pacific, west of Patagonia, the area of relatively shallow soundings (under 2,000 fathoms) extending from the coast, is usually bent southward at its outer western limit so as to include the area of similar soundings on the parallel of 40° and 50° , between 112° and 122° W. The prevailing trends of the ocean are opposed to such a bend, and Prof. Dana does not adopt it. In the Antarctic Atlantic a large area of 3,000 and 4,000 fathoms has been located about the parallel of $66\frac{1}{2}^{\circ}$ S. and the meridian of $13\frac{1}{2}^{\circ}$ W. The authority for this was a sounding made in 1842 by Capt. Ross, R. N., who found no bottom with a line of 4,000 fathoms. The means available at the date given were not "sufficient to ensure the accuracy of such deep casts."

In a bathymetric map the trends in feature-lines are the trends of the great mountain ranges themselves, and in the Pacific, these mountain courses are those of half a hemisphere.

Prof. Dana states briefly some of the deductions from such a map :

1. Over the Pacific area there are *no* prominent north-and-south, or meridional courses in its ranges, and none over the Atlantic, except the axial range of rela-

tively shallow water in the South Atlantic. There are none in the great ranges of Asia and Europe, excepting the Urals; none in North America; none in South America, excepting a part of those on its west side.

2. The ranges in the Pacific have a mean trend of not far from northwest-by-west. One *transverse* range crosses the middle South Pacific, beginning to the south in New Zealand and the islands south of it, with the course N. 35° E., and continuing through the Kermadec Islands and the Tonga group, the latter trending about N. 22° E.

3. The oceanic ranges are rarely straight, but change gradually in trend through a large curve or a series of curves, and the intersections of crossing ranges, curved or not, are in general nearly rectangular.

4. Approximate parallelisms exist between the distant ranges or feature-lines; as (1) between the trend of the New Zealand range and that of the east coast of North America; and also that of South America (continued across the ocean to Scandinavia); also (2) between the trend of the foot of the New Zealand boot with the Louisiade group and New Guinea farther west, and the mean trend of the islands of the Central Pacific and that of the north shore of South America.

5. The relatively shallow-water area which stretches across the North Atlantic from Scandinavia to Greenland is continued south-westward in the direction of the axis of the North Atlantic and becomes the "Dolphin shoal."

It is suggested that it may be a correlate fact that a Patagonian plateau stretches out from high southern latitudes in the direction of the longer axis of the Pacific;

and in a note Prof. Dana calls attention to the parallelism between the Mediterranean Sea and the West India (or West Mediterranean) Sea that divides North from South America. Both these seas have an *eastern, middle* and *western* deep basin.

Their depths are, in the Mediterranean, 2,170, 2,040 and 1,585 fathoms; in the West Mediterranean (the three being the Caribbean, the West Caribbean or Cuban, and the Gulf of Mexico), 2,804, 3,428 and 2,080 fathoms. Further, in each Mediterranean Sea, a shallow-water plateau extends from a prominent point on the south side, northward, to islands between the eastern and middle of the deep basins; one from the northeast angle of Tunis to Sicily, the other from the northeast angle of Honduras to Jamaica and Haiti, the two about the same in range of depth of water.

The general truths illustrated by the map are: that system in the feature-lines is a fact; that the system is world-wide in its scope; and that it had its foundation in the beginning of the earth's genesis and was developed to full completion with its growth.

Facts which favor the volcanic origin of the troughs are:

1. The existence of the depressions in the close vicinity of the Hawaiian Islands, one 3,023 fathoms deep to the northeast of Oahu and another 2,875 fathoms deep east of Hawaii; besides a trough 450 miles northeast of Oahu with a depth of 3,000 to 3,540 fathoms, and another, as far south, with soundings of 3,000 to 3,100 fathoms.

2. The depth of 4,475 fathoms found by the *Challenger* off Guam, the largest island of the volcanic Ladrões, in the western North Pacific.

3. The fact that east of Japan and the Kuriles, a region of ranges of volcanoes, there is the longest and deepest trough of the ocean, the length 1,800 miles, the depths 4,000 to 4,650 fathoms; while farther northeast, south of one of the Aleutian islands, a depth of 4,000 fathoms occurs again, and still farther east depths of 3,100 to 3,664 fathoms are found.

On the other hand there are striking examples of the absence of deep troughs from the vicinity of eminently volcanic regions. With the exception of a short trough with soundings of 3,000 to 3,368 fathoms close to the Peruvian shore, the depth of the ocean off the western border of North and South America is between 2,000 and 2,700 fathoms, and just south of Valparaiso it shallows to 1,325 fathoms. It deserves consideration, however, that the waters of this border of America deepen abruptly compared with those of the Atlantic side.

Off Central America where the volcanoes are quite near to the ocean, the depths are between 1,500 and 2,500 fathoms. The condition is the same off the west coast of North America.

In the North Atlantic the North American side has larger areas of deep water and much greater mean depth than the European side with its volcanoes. The volcanic Azores have depths around them of only 1,000 to 2,000 fathoms and no troughs. Iceland is in still shallower waters; and the Canaries, though volcanic, have no deep trough near them. Many of the deep areas in the Pacific are so situated that no reason is apparent for referring them to a volcanic origin. The seven 3,000-fathom areas of the Atlantic occupy positions that suggest no relation to volcanic conditions.

A possible volcanic origin is admitted for the depression of 2,445 fathoms 40 miles west of the Cape Verde Archipelago and for that of 2,060 fathoms within 20 miles of Ascension Island. The most remarkable depths of the Atlantic are in the West Indies, the deepest trough, 4,561 fathoms, being within 70 miles of Porto Rico, an island which has no great volcanic mountain. North of the Bahama belt of coral reefs and islands, the depth becomes 2,700 to 3,000 fathoms within 20 miles of the coast line, and at one point 2,990 fathoms within 12 miles and there is nothing to suggest a volcanic cause for the descent.

Prof. Dana holds the opinion that the arrangement of the deep sea troughs in the two halves of the oceans points to some other than a volcanic origin. The *western* half of the Atlantic and Pacific oceans contains much the larger part of the 3,000-fathom areas and all the depths over 4,000 fathoms. Viewed as a whole, the Pacific may be said to have a westward slope in its bottom or from the South American coast toward Japan. This slope exists even in the area between New Zealand and Australia. In the Atlantic, the slope is in the direction of its northeast-northwest axis, either side of the Dolphin shoal, but especially the western side, rather than from east to west. Owing to the system in the Atlantic topography, the Dolphin shoal—the site of what Prof. Dana unkindly calls the *Atlantis* of “ancient and modern fable”—is really an appendage to the eastern continent, that is to Europe, and is shut off by wide abyssal seas from the lands to the west.

It is to be noted that in the Indian Ocean the greatest depths are found in the *eastern* part, off the

northwest coast of Australia and near western Java and Sumatra.

THE FOURTH CENTENARY OF THE DISCOVERY OF AMERICA.—The Madrid *Real Academia de la Historia* has made public the following programme of an International Competition for 1892 :

A competition is opened to solemnize this great occasion by a literary monument that shall endure and record it.

The work must be a composition in prose, a judicious historical picture, that shall correctly set forth the greatness of the event which is to be celebrated.

From the beginning of the sixteenth century to the present day so much has been said upon this subject that it seems difficult to write anything new and good.

With regard to details, perhaps, and the circumstances of the life and acts of Columbus, there remains not a little to be investigated, but the Royal Academy of History is already busied with this task of erudition and diligence in the collection and publication of documents previously unpublished, or not widely known.

The book now proposed for competition must be of a different order. It must be comprehensive and compendious, and sufficiently concise, without becoming dry or obscure.

In the abundance of works on the history of America, on voyages and discoveries, on the science of geography and the European establishments in the most distant regions of the world, there is no one book that sets in its proper light the combined action of the nations of the Iberian peninsula in the sixteenth century, when

they carried out in a hundred years of unexampled effort, with firmness of purpose and astonishing steadiness and tenacity, the exploration of vast islands and continents, and crossed oceans never before ploughed by the keels of a Christian people, and gained in their rivalry with each other an almost complete acquaintance with the planet on which we live.

In this work there is a progressive interest, as well as a manifest unity. Passing over the indications afforded by some maps, such as the Catalan of 1375, and by half-fabulous voyages like those of Doria and Vivaldi and by others better authenticated, but still isolated and without result, like that of Ferrer, this unity, in what it contains of most important, begins with 1434, when Gil Eannes doubled Cape Bojador, discovered Guinea and dissipated the terror that brooded over the dark ocean, and ends with 1522, when Elcano arrived at San Lúcar after having sailed around the world.

In all this action but little was left to chance. The progressive series of geographical discoveries, due to persistent forethought and not to accident, finds its origin at Sagres with Prince Henry the Navigator and his illustrious pilot, Jaime de Mallorca.

From that time until the form and the magnitude of the terraqueous globe became clearly known, Pedro Núñez might well boast that nearly every result had been obtained, not by following mere conjecture, "but because our navigators went well instructed and provided with instruments and with rules of Astrology and Geography, things not to be dispensed with by cosmographers."

The culminating point in the development of this

beautiful history is reached on the 12th day of October, 1492, when Columbus was the first European to set foot on the intertropical soil of the New World; but this event, beyond the significance it has, when considered in itself alone as an effect of the individual inspiration of a seaman and of the generous enthusiasm of the queen who protected him, is found to possess a higher meaning when taken in conjunction with the entire action, and with the unfolding of the design to explore the whole globe and to extend everywhere the law and the name of Christ with the civilization of Europe, no less than to take possession of the gold and spices and riches of every kind, known only by costly specimens and exaggerated reports, furnished by the Venetian and Genoese and Catalan traders into whose hands these products were delivered by the Mohammedans.

Undoubtedly the force which moved the men of our peninsula to an enterprise like this was the resultant of whatever great sentiments, evil and good, are to be found in the heart: religious fervor, thirst for glory, ambition, Christian charity, greed, curiosity and eagerness to penetrate the unknown, and, above all, the longing, in the full day of the Renaissance, to seek and to encounter real adventures that should eclipse the fantastic, vain and aimless stories of the books of chivalry, and to accomplish voyages and conquests that should surpass those of the Greeks and the Romans and the fables of classical antiquity, then freshly revived by scholars and made familiar to all men.

What is to be written is the complete representation of all this enterprise, so that its vast significance may be distinctly seen without in any way lessening the convic-

tion that the conceptions, the marches and the voyages and the successful daring of Bartolomé Diaz, Gama, Albuquerque, Cabral, Balboa, Magellan, Cortés, Pizarro, Orellana, and so many others, far from diminishing the glory of the hero whose centenary is to be celebrated, do but serve to heighten it ; and to display in its most luminous aspect the work of civilization, in which Portugal laid the foundation, while Castile, with Columbus, bore the principal and the most arduous part, and all Spain gave to the task its fitting conclusion by opening the strait that bounds the American continent, and crossing for the first time an ocean mightier than the Atlantic and circumnavigating the globe.

The book, thus dimly outlined, must present in a compendious introduction notices of voyages, ideas, and geographical advancement up to the establishment made by Prince Henry the Navigator at Sagres ; and must close with a more extended conclusion, in which shall be considered and estimated the changes and the ameliorations that have been the consequence of our collective work ; in commerce, in the economical and political condition of the peoples, in the broad field thrown open for the spread and the domination of the intelligent European activity, in the abundance of facts observed and hopes well-founded, and in the more certain basis afforded to scholars and scientific men for the better understanding of Nature, the penetration of her mysteries and the unveiling of her laws.

The elevation and magnitude of the subject require that the book shall be a finished work of art, not as regards richness and ornament of diction, but as to the arrangement of the plan and the sobriety

and purity of style, which must owe its nobleness and beauty to the clearness of the language, the correctness of the judgment and the sustained force of the thought.

Any unpublished work, written especially for this occasion in Spanish, or Portuguese, or English, or German, or French, or Italian, may be sent in for competition.

The award will be made by a Tribunal composed of two members of the *Real Academia de la Historia*, and one member of each of the following Academies: the *Real Academia Española*, the *R. A. de Ciencias morales y políticas*, and the *R. A. de Ciencias exactas y naturales*, the members to be chosen by the respective Academies; and a seat in the Tribunal shall belong to the diplomatic, or specially designated, Representative of every Power, a subject of which shall present through him a book for the competition.

The Tribunal shall elect its own President and shall render its decision upon the works submitted by absolute majority of votes of those present at the time of voting.

The works submitted must be neatly bound and written in a legible hand on good paper, without the author's name, and inscribed with a motto.

The same motto and the first phrase of the work shall be written upon the outside of a sealed envelope, which shall contain in each case the name and the residence of the author.

The sealed envelopes, identifying the works which do not obtain a prize, shall be publicly burned unopened.

Although it is difficult to assign an exact limit to such a work, it ought not to exceed the reading matter contained in 2 volumes of 500 pages each, of the size and type of the complete works of Cervantes, edition of Rivadeneyra, 1863 and 1864. (This edition is an imp. 8vo, with about 450 words to the page.)

Nevertheless, as some margin must be allowed, there may be added to the text, if the plan or the development of any one of the works requires it, a supplementary volume of documents, maps and other illustrations.

In order to afford time for examination and judgment, the works intended for the competition must be delivered to the Secretary of the *Real Academia de la Historia* before the 1st of January, 1892.

There will be a first prize of 30,000 pesetas (\$5,625) and a second prize of 15,000 pesetas (\$2,812.50). In addition to these, each author will receive 500 copies of his work when printed.

It will be for the Committee on the Centenary to determine the number of copies of which the edition of each work shall consist, and the disposition to be made of the copies not delivered to the authors.

The authors shall retain the right of property in their works, and the right to reprint them, to sell them and to have them translated into other languages.

The Committee, however, reserves the right if the award shall be made, in either or in both cases, in favor of works written in a foreign language, to have these translated and published in Spanish.

The preceding conditions are given to the press by the Committee for the information of the public, and for

the guidance of those who may desire to take part in the competition.

MADRID, June 19th, 1889.

DUQUE DE VERAGUA,
Vice-President.

JUAN VALERA,
JUAN F. RIAÑO,
Secretaries.

THE ROYAL SOCIETY OF NEW SOUTH WALES offers its medal and a money prize for communications on the following subjects :

SERIES IX.—*To be sent in not later than 1st May, 1890.*

No. 31.—The Influence of the Australian Climate (general and local) in the Development and Modification of Disease. The Society's medal and £25.

No. 32.—On the Silver Ore Deposits of New South Wales. The Society's medal and £25.

No. 33.—On the Occurrence of Precious Stones in New South Wales, with a Description of the Deposits in which they are found. The Society's medal and £25.

SERIES X.—*To be sent in not later than 1st May, 1891.*

No. 34.—The Meteorology of Australia, New Zealand and Tasmania. The Society's medal and £25.

No. 35. Anatomy and Life History of the Echidna and Platypus. The Society's medal and £25.

No. 36.—The Microscopic Structure of Australian Rocks. The Society's medal and £25.

The competition is in no way confined to members of the Society, nor to residents in Australia, but is open to all without any restriction whatever, excepting that a prize will not be awarded to a member of the Council

for the time being ; neither will an award be made for a mere compilation, however meritorious in its way. The communication to be successful must be either wholly or in part the result of original observation or research on the part of the contributor.

The Society is fully sensible that the money value of the prize will not repay an investigator for the expenditure of his time and labor, but it is hoped that the honor will be regarded as a sufficient inducement and reward.

The successful papers will be published in the Society's Annual Volume. Fifty reprint copies will be furnished to the author free of expense.

Competitors are requested to write upon foolscap paper—on one side only. A motto must be used instead of the writer's name, and each paper must be accompanied by a sealed envelope bearing the motto outside and containing the writer's name and address inside.

All communications to be addressed to the Honorary Secretaries.

37 Elizabeth Street, Sydney.

A. LIVERSIDGE,
F. B. KYNGDON,
Honorary Secretaries.

LAKE CHAMPLAIN.—In Appendix No. 7, Report of the U. S. Coast and Geodetic Survey for 1887, Mr. Charles A. Schott makes a preliminary report on the fluctuations in the level of Lake Champlain, and the average height of its surface above the sea.

The average elevation of the lake, as given by various authorities up to 1887, was generally confined within the limits of 90 and 100 feet, and there was no great error in any one estimate.

With the data at command, Mr. Schott fixes the height above the mean sea-level at 29m.618, or 97.17 feet.

The statements as to the greatest depth of the lake show a wide discrepancy between 252 feet, accepted by some authorities, and 600 feet, as given in Lippincott's *Gazetteer* (1882). The deepest sounding made by the Coast Survey in 1870-74, and published in 1879-80, was 399 feet, off Wing's Point, in lat. $44^{\circ} 18'$, long. $73^{\circ} 19'$. Mr. Schott finds reason for adding 3 feet to this result, and fixes the depth at 402 feet; more than 300 feet, that is to say, below the level of the Atlantic Ocean.

The irregular, periodic, and secular variations in the lake level as observed during twelve years, indicate a *total* range of 8 feet at the northern outlet, and no doubt this range is greatly exceeded at points near the opposite extremity under the influence of strong and continuous northerly winds. (By *secular* variations Mr. Schott seems to mean the variations for the period during which observations have been made.)

The mean variation, according to 12 years' observations, from 1871 to 1882, was 2.64 feet, and the annual observations showed that the lake level was highest in May and lowest in October.

CLIMATOLOGY OF PENNSYLVANIA.—The Annual Report of Thos. J. Stewart, Secretary of Internal Affairs of Pennsylvania, for the year ending Nov. 30, 1888, includes a paper covering more than 200 pages on the Climatology of the State, by Lorin Blodgett.

Observations at 180 stations are given for periods

varying from a few months at some to a continuous record of 69 years at Morrisville, Bucks County.

For Philadelphia, the independent reports number 22, many of them, of course, contemporary and aggregating 300 years.

The study of these records reveals, according to Mr. Blodgett, a perfect symmetry in the curves of temperature. In all cases the minimum is in January, and later than the middle of the month. January is 3° colder than December, and February is $1^{\circ}.5$ warmer than January. In the colder parts of the State, March is a full winter month, with a mean of 30° , while at Philadelphia, Lancaster and Harrisbnrg, the mean for March is 40° .

These three cities typify the climate of the southern part of Pennsylvania.

The spring months should include June, and from April to June the increase of heat is 10° for each month over the preceding month. In many cases the March mean being near 40° , that for April is 50° to 51° , that for May 60° to 62° , and that for June 70° to 71° .

The declining side of the thermal curve shows a fall of 3° from July to August, one of 6° from August to September, and one of 11° , each, from September to October and from October to November. From November to December the fall is 10° .

Mr. Blodgett's paper is illustrated by a map showing the isothermal lines and the elevations above tide-water.

INFORMATION REGARDING THE GEOGRAPHY OF MINNESOTA.—The Minnesota Historical Society of St. Paul, under date of July 12, 1889, calls attention to the following Act of the Legislature of the State :

(H. F. No. 702.)

**AN ACT TO FIX THE NAME OF A LAKE
FORMERLY KNOWN AS ELK LAKE.**

Be it enacted by the Legislature of the State of Minnesota :

SECTION 1. That the lake known for many years to the Indians and early explorers as Elk lake, situated in Beltrami county, in section twenty-two (22) of town one hundred and forty-three (143) north, range thirty-six (36) west, fifth principal meridian, shall be known and designated hereafter on all official maps of the State, and named in all county and State records referring to the same, as "Elk Lake."

SEC. 2. No edition of any school geography, published subsequently to January one, eighteen hundred and ninety, which contains any map giving any name to the lake specified in section one other than "Elk lake," shall be used in the schools of this State.

SEC. 3. This act shall take effect and be in force from and after its passage.

Approved April 24, 1889.

It is added that the action of the Legislature was "occasioned by the fact that one Willard Glazier had (in 1881) endeavored to have the name 'Elk Lake' changed, and called for himself, and he issued maps with his name on them, and also prevailed on map publishers to make the same change. Such changing of the name of Elk Lake was without any sanction of authority, and is not recognized by the people of the State, as the passage of the above act evinces." This should dispose of Capt. Glazier, but many things that should be are not.

THE NAME OF AMERICA.—M. L. Gallois, professor of history and geography at Lyons, writes in the September *Bulletin* of the Lyons Geographical Society a brief criticism of Mr. Jules Marcou's *Nouvelles Recherches sur l'Origine du Nom d'Amérique*. M. Gallois remarks that the true name of the mountains, which Mr. Marcou calls the *Amerrique* range, is *Amerrique*; that there is no reason to believe that Vespucci ever saw the coast of Nicaragua; that Vespucci's name was *Amerigo*; and that Waldseemüller's positive statement in the *Cosmographie Introductio* that he took the name he gave to America from the name of Vespucci must be accepted.

Mr. Marcou denounces Waldseemüller as "a block-head, a mere salaried assistant, occupied in the preparation of maps for a new edition of Ptolemy, and in proof-reading in the printing establishment of the Luds."

At this rate, asks M. Gallois, what is to be said of Erasmus, who did not disdain to correct proofs for his friend Froben? And who can believe that the Ptolemy of 1513 was produced by the first man that came along?

Mr. Marcou first published his hypothesis in 1875. "He tries now," says his critic, in conclusion, "to support his theory by facts; but this he ought to have done in the beginning. The Paris Geographical Society, fortunately, does not make itself responsible for the opinions which it prints, but we must regret that it was generous enough to give up eighty pages of its *Bulletin* to this fantastic paper."

THE YUKON DISTRICT.—Among the recent publications of the Geological and Natural History Survey of Canada is Dr. George M. Dawson's report on his ex-

ploration of the Yukon District and the adjacent northern portion of British Columbia. The region is bounded to the south by the 60th parallel of latitude, to the west by Alaska, to the east by the Rocky Mountain Ranges and the 136th meridian, and to the north by the Arctic Ocean; and it has an area of about 192,000 square miles, of which over 150,000 are included in the watershed of the Yukon.

The main geographical results were : an instrumentally-measured line from the head of Lynn Canal to the intersection of the Yukon or Pelly by the 141st meridian ; an instrumental survey of the Stikine from its mouth to the head of navigation (Telegraph Creek), connected with Dease Lake by a carefully paced traverse ; a detailed running or track-survey following the lines of the Dease, Upper Liard and Pelly rivers and connecting with the line at the mouth of the Lewes.

The entire distance travelled during the exploration amounted to 1,322 miles, and this, taken in connection with the coast-line between the Stikine and Lynn Canal, circumscribes an area of about 63,200 square miles, the interior of which is still practically a *terra incognita*. The same description, says Dr. Dawson, with little qualification, applies to the whole surrounding region outside the surveyed circuit ; so that there remain scope and verge enough for future explorers in the 192,000 square miles of the Yukon District. Along the routes travelled numerous points were carefully fixed in latitude by sextant observations, and a sufficient number of chronometer longitudes were obtained to lay the whole down within small limits of error. Special attention was paid to the fixing of mountain topography in sight from

the line of travel and approximate altitudes of more prominent peaks were ascertained.

Dr. Dawson was disappointed in the size of the Yukon River where he saw it below the confluence of the Lewes. At this point the Yukon (or Pelly, the name Dr. Dawson inclines to prefer) was about 1,700 feet in width, with a maximum depth of about ten feet, and there seems to be little doubt that its magnitude has been exaggerated in previous reports. Its total drainage area is but 331,000 square miles, less than half that of the Mackenzie, and there is nothing to show that there is any serious difference in the amount of precipitation over the two areas.

Lieut. Schwatka's dealings with the nomenclature of rivers and places in this region do not commend themselves to Dr. Dawson. He holds, fairly enough, that the old established and prior name of the Lewes River should not be arbitrarily erased in favor of the Yukon, and he declares that it is in any case incorrect to assert that the Yukon (Lewes) rises in Lake Lindeman, for the greater part of the water of the river enters by the Taku arm of Tagish Lake. Due credit is given to Lieut. Schwatka for having made the first (and reasonably accurate) survey of the river, and many of the names he invented are retained by Dr. Dawson, "more especially in view of their scientific eminence."

This seems to be a mistaken principle. It would be an act of presumption on the part of a tourist to bestow names on mountains and rivers at his own pleasure, and the license refused to him should be all the more sternly refused to an explorer who is under serious bonds to truth and to history and to the civilized world.

The report is illustrated by a map on a scale of 1 : 506,880, in three sheets.

WINTER NAVIGATION OF THE ST. LAWRENCE RIVER.— This subject, which has been taken up by the Quebec Geographical Society, is treated at considerable length in the *Transactions*, just issued, for the years 1886–87,–88–89.

Letters are printed from mariners and other persons of experience, all to the effect that the practical difficulties in the way of the desired end may be overcome. It is declared that the complete success of the ice-boats used in Sweden and Denmark for opening the Cattegat has solved the problem.

An extract from *Le Génie Civil*, of December, 1886, gives an account of the first experiments made at Gotenburg, where a channel was cut with ease through ice 13 inches thick. This triumph moved the people of Christiania, in *Sweden*, to follow the example, and this strange conduct does not seem to have surprised the Quebec geographers.

Capt. N. LeVasseur vigorously calls for action by the Dominion Government, and urges upon its attention two important considerations :

“1st. That many countries, in a position identical with our own as regards winter navigation, will profit by the experiments made in Canada ; 2d. That thousands upon thousands of the Canadian people, from one end of the Confederation to the other, will be greatly benefitted, some directly and others indirectly, by the definitive solution of the problem.”

Other papers in the *Transactions* are : The Landfall

of Cabot, by Mr. J. P. Howley, who does not take Prof. Horsford's view ; The Moundbuilders of North America ; Lake Mistassini ; The Copper River Indians ; Notes on Labrador, etc.

A tribute of respect is due to the energy and steadfastness with which the Quebec Geographical Society has borne up under the discouraging conditions of the past four years, and it is to be hoped that the future holds for it nothing but prosperity.

STORM SIGNALS AT HAVANA.—The U. S. Hydrographic Office publishes in the Pilot Chart of the North Atlantic for September the system of storm signals, which went into effect at Havana on the 2d August, and will be observed during the hurricane season (July—October) in the West Indies :

TRIANGULAR RED FLAG.—Cautionary signal.

SQUARE FLAG, YELLOW AND BLUE HORIZONTAL STRIPES.—Storm signal.

BLACK BALL.—The port is closed.

BLACK BALL OVER TRIANGULAR RED FLAG.—Indications of clearing weather.

BLACK BALL OVER YELLOW AND BLUE FLAG.—Clearing weather.

The signals are shown at the office of the Captain of the Port and at the Morro Semaphore Station.

THE MEXICAN FLOODS OF 1888.—The *Observatorio Meteor.-Magnético Central*, of Mexico, has issued a very full supplement to the December number of its *Boletín*. This supplement contains detailed reports of the disastrous floods in the month of June, 1888, the re-

sult of the excessive rains which began on the 6th and continued to the end of the month, over a surface "comprehended between the parallels of 16° and 50° N., and the meridians of 62° and 107° W. of Greenwich, embracing, therefore, in the United States the States on the Atlantic and the Gulf, and those adjacent and covering the Mexican Republic in a N. E.-S. W. direction to the S. of a line drawn from the extreme northwestern part of Tamaulipas to Mazatlan. In all this region it rained from the Gulf to the Pacific."

The destruction, great everywhere throughout this vast extent, was most marked in the city of Leon, in the State of Guanajuato. The population numbered 80,000, and out of the 249 blocks, or squares, of houses in the city, 117 were inundated and 79 were completely destroyed.

Two hundred and fifty-two dead bodies were recovered, but many were swept away by the waters.

The latter and larger part of the supplement is devoted to an account of the September cyclone of 1888, which wrought such havoc in Cuba and the north of Yucatan.

This interesting publication is illustrated by maps of the cities of Leon and Lagos, showing in colors the inundated portion of each, and by a third, representing the path of the hurricane across the island of Cuba.

DRAINAGE OF THE VALLEY OF MEXICO.—The *Rail-road and Engineering Journal*, for September, gives a map and a brief description of the plan, now in process of execution, for relieving the city of Mexico from the dread of inundation. The city stands on the shore of

Lake Tezcoco, the lowest of the six lakes in the Valley, which has an area of about 1,650 square miles.

The canal, the principal feature of the plan, is divided into two parts, the first, 12.4 miles in length, to carry water from the lake to the city, and the second, nearly three times the capacity of the first, to carry the surplus water of the lake and the discharge from the city. This second section is 17.4 miles in length and 21 feet in depth; and the fall for the whole length is 1 : 5,000. The most important part of the work is the tunnel, which will begin at the end of the canal and extend through the mountains for a distance of 5.9 miles, with a deep cutting of 1,640 feet in length at the outer end. The fall through the tunnel will be 1 : 1,000 and the cross-section will be semi-ovoid.

The upper or arch part of the tunnel will be lined with brick, and the lower part with stone and cement; and much of the work which was done over twenty years ago can be utilized in the construction of the canal.

LABRE'S EXPLORATIONS IN BRAZIL AND BOLIVIA.—The August number of the Royal Geographical Society's *Proceedings* has an account, contributed by the Peruvian Vice-Consul at Southampton, of Col. Antonio R. P. Labre's journeys in the region comprised between the Beni and the Purus rivers. These journeys, performed at various times between the years 1872 and 1887, were undertaken mainly for the purpose of investigating the resources of the country and exploring commercial routes. In his earlier visits the traveller became familiar with the Ituxy River, a tributary of the Purus, navigable

during the wet season for 370 miles, and in 1884 he took two steamers up to the mouth of the Curykethé, 200 miles from the Purus. There he established india-rubber stations, which are visited every year. Up to this point the banks of the Ituxy are low and often flooded, but beyond it the ground is higher. The soil is good, and the river flows through a forest. There live in this district tribes of Indians, still in a wild state. Each tribe has numerous small villages governed by one or two chiefs. In 1879 three youths of the Hy-puriná tribe were entrusted to Col. Labre for education and one of them has learned how to read and write. The whole number of the natives living on the Purus and its tributaries is estimated at 40,000, speaking forty or more different languages.

The principal journey was the one made in 1887 for the purpose of crossing overland from the india-rubber settlements on the Madre de Dios, an affluent of the Beni from the west, to the nearest navigable point on the Aquiry tributary of the Purus, in order to ascertain if the ground offered facilities for the construction of a road. Col. Labre ascended the Madeira from the Amazon, with a well-equipped party of Bolivian traders, to San Antonio at the foot of the falls. From this place to Villa Bella, at the mouth of the Beni, is a distance of 161 miles. All the trade between the Amazon River and Bolivia passes this way. There are nine falls or rapids to be turned by unloading the canoes and dragging them overland on wooden rollers, and Col. Labre took 34 days to accomplish the journey. He ascended the Beni, which has low, forest-covered banks, with many islands in the stream, and inland lakes com-

municating with it from both sides, up to its junction with the Madre de Dios.

At Port Maravilha on this river he began his overland march. The country was covered with forest, part of it composed of Brazil-nut trees. The first village was inhabited by civilized Araúnas. Three days later the party came to a second settlement, where they passed the night; and two days after to a third, with about 200 inhabitants. These Araúnas had a form of government (which is not described), temples, and worship. The villagers had plantations.

Their women are not allowed to enter a temple nor to take part in the religious or fetich ceremonies, and they are forbidden to know the names or the forms of the idols. These idols are geometrical figures made of polished wood. The father of the gods is called Epy-mará; his figure is of elliptical form and about 16 inches high. There are also gods of stone. There are "medicine-men" charged with religious duties and living a celibate life, and the chief is the *pontifex*.

Another chief, at a place called Cuyneputhsúa, undertook to pass Col. Labre on to the Guarayos, a neighboring people. Up to this point the march had been in a northwesterly direction; but here it turned to the west, and led through a country like that already traversed, full of streams and dense forests. At the Caramánu River the Guarayo district was reached and the original northwesterly direction was resumed.

Beyond the Guarayo district was that of the Cannamary, who did not seem to be pleased at the sight of the white men; and Col. Labre thought it prudent to withdraw to the forest for the night.

The march was resumed the next day, but the people fled from the strangers. Another tribe, the Cannarana, acted in the same way, but there were no mishaps, and on the 30th August, 20 days after beginning his overland journey, Col. Labre arrived at Brejo da Ponte, on the Aquiry River. He reports that the route is practicable, and will become, especially if a railway is constructed, the highway for all the trade of the Mamoré and Beni basins.

LAKE TITICACA.—Dr. Alfred Hettner in his third Report on his travels in Peru and Bolivia (*Verhandlungen der Gesellschaft für Erdkunde*, Berlin, No. 6, 1889), notes the evidences of great changes in the level of Lake Titicaca, in the terraces which surround it. He believes that in a comparatively recent geological period the surface must have been about 65 feet higher than it is now, and that the lake extended over the greater part of the neighboring plains, perhaps even as far as the Poopo (or Aullagas) Lake. At an earlier date the level must have been, as numerous indications show, 660 feet higher than at present, but there are signs also that it must have been depressed at one time below the level of to-day. The highest mark of the lake-level is older than the evidences of glacial action in the region, and contemporaneous with a period of especially strong volcanic activity, and certainly of the later Tertiary; and the 65 feet terraces may belong to the glacial period.

Dr. Hettner could find not the least support for the theory that the lake was in ancient times covered by the sea; but he is not prepared, in the absence of acquaint-

tance with the southern portion of the highlands, to deny that a communication between the lake and the ocean may have existed in the time of the 660 feet terraces.

IMMIGRATION INTO THE ARGENTINE REPUBLIC.—The *Boletín*, Vol. 10, No. 5, of the *Instituto Geográfico Argentino* gives a table showing the movement of immigration into the Republic since 1857. The table is official, having been prepared by the Superintendent of the Department of Immigration, and its figures tell a plain story. The arrivals were :

In 1857	4,951	In 1873.....	76,332
1858.....	4,658	1874.....	68,277
1859.....	4,735	1875....	42,066
1860.....	5,656	1876.....	30,965
1861.....	6,301	1877.....	36,325
1862	6,716	1878.....	42,958
1863.....	10,408	1879.....	55,155
1864.....	11,682	1880.....	41,651
1865.....	11,767	1881.....	47,484
1866... ..	13,696	1882.....	51,503
1867.....	17,046	1883.....	63,243
1868.....	29,234	1884.....	77,805
1869... ..	37,934	1885.....	108,722
1870.....	39,967	1886.....	93,116
1871	20,933	1887.....	120,842
1872.....	37,037	1888... ..	155,632
		Total.	1,374,797

Of this number 990,192 came directly from beyond sea and 384,605 by way of Montevideo.

The figures do not include the 250,000 first-class passengers who entered the country during the thirty-two years; so that the whole immigration for the period amounted to 1,624,797.

According to the U. S. Census the arrivals of for-

eigners in the United States for the period 1790-1840-41 were 1,132,860. The next ten years added to this number 1,593,826.

Of the 990,192 immigrants from beyond sea into the Argentine Republic there were 646,086 Italians, 144,654 Spaniards, 91,759 Frenchmen, 22,952 Englishmen, 18,072 Swiss, 16,768 Austrians, 15,271 Germans, 7,645 Belgians, and 26,985 of various nationalities, not specified.

Three-fourths of the immigrants were men, the proportion of women varying from 29.5 per cent. of the Italians to 9.2 per cent. of the Belgians.

THE MANCHESTER GEOGRAPHICAL SOCIETY. — The *Journal* of the Manchester Geographical Society, hitherto published at irregular intervals, will be issued quarterly during the present year, and will so continue. It is a pleasure to note this evidence of prosperity in a society whose four years of existence have been full of good work.

GEOGRAPHY AT OXFORD. — Mr. H. J. Mackinder, M. A., Reader in Geography at Oxford, reports to the Royal Geographical Society (*Proceedings*, August, 1889) that the past Academical year has been one of steady progress. His audiences were twice as large as those of the previous year, and his subjects were :

The Physical Geography of the Continents, the British Isles, The History of Discovery, Western and Central Europe, The Mediterranean and Mediterranean Lands, and Russia and Asia with reference to History.

Prof. Freeman, Mr. Sidney Owen and Mr. George also lectured on geographical subjects.

Mr. Mackinder finds that the number of his hearers will vary from 5 to 80, and that if the Readership in Geography is to have an established position, it must be through the History School.

There is now, it seems, no separate paper on Geography set in the examination. Compulsory Geography questions are now set in the History papers and Mr. Mackinder was requested, but refused, to lecture on the geography of special periods. This he felt would make his teaching merely historical, and all that remained was to offer to historical students an elementary course which should present a general but vivid conception of the theatre of history. He is led to hope for a large class next year.

There is a tone of disappointment in Mr. Mackinder's letter, and his admissions do not sustain the promise of his opening sentence; but there is no reason why he should be discouraged.

It would be an excellent thing if geography could be studied for itself, but it has practical relations with history, and these have long constituted its chief value in the eyes of the educated public. To purge the general sight is a work of time, and the public must do its part. A great deal has been gained when 5 men, or 80 men, have been induced to study geography with or without history.

METEOROLOGY AND CLIMATE OF SUEZ.—Mr. W. G. Black, Surgeon-Major, Edinburgh, contributes to the *Journal* of the Manchester Geographical Society, Nos.

7-12, 1888, a paper on the climatic conditions at Suez before and after the opening of the Canal.

The prevailing winds are north and northwest. The hot winds are the *Khamseens*, mostly from the south but frequently from the west. They last two days, very rarely to the third day, and are followed by the etesian wind from the north. This is very violent and fills the air with fine sand so that the sky takes a yellow color.

The observations for 1866-1869 were made by Mons. Brittain; those for 1869-1872 by Dr. J. A. Woolfreys.

The monthly tables show that the average maximum of summer temperature has risen from 102.7° to 111.5° and the average minimum has fallen from 64.7° to 60.7° , while the winter temperature has advanced from 75.4° to 86.2° , maximum, and has fallen from 46.4° to 39.8° , minimum.

These changes may be partly due to the movement of water into the Canal from the heated Red Sea on the one side and from the colder Mediterranean on the other.

The summer heat at Suez often rises to 100° - 120° , but the mercury sometimes falls to 44° - 32° ; and in winter the range is from 30° or 40° to 80° or 90° .

The barometer in the winter months is high, but the whole range from the lowest in spring (29.59 in.) to the highest in winter (30.49 in.) is small.

WHAT IS DONE IN ZULULAND.—*L'Afrique Explorée et Civilisée*, in the number for September, 1889 (pp. 261-262), quotes from a letter addressed to it by Mr. Charles Hancock, of London, one of the Executive Committee of the Aborigines Protection Society, two

statements concerning the treatment of the Zulus by the English. In one instance, cited by Mr. Bradlaugh in the House of Commons, a native was flogged with a cat-o'-nine-tails with points of iron. In the other, according to testimony before the Court at Etshowé (Ekhowa) in the trial of Dinizulu, Cetewayo's son, and other chiefs for high treason and rebellion, it was affirmed that three hundred women and children, captured by a detachment under the orders of Maj. McKean, were handed over to Uzibepu, a favorite of the Governor's, and to his soldiers, and were only released through the exertions of Miss Colenso and her friends.

The editor of the Geneva journal asks whether it ought to be possible to commit a deed so monstrous under the name of a nation that stands in the first rank of civilization. He may be astonished to learn that a similar atrocity stands on record against the name of no less a man than Gen. Gordon. In a book published in 1881, called "Colonel Gordon in Central Africa, 1874-1879. . . . From Original Letters and Documents," edited by Dr. George Birkbeck Hill, and by him dedicated to Miss Gordon, there is (p. 345) a letter dated Edowa, March 31, and in this are the following passages: "This evening a party of seven slave-dealers with twenty-three slaves were captured and brought to me together with two camels. . . . I got the slave-dealers chained at once, and then decided about the slaves. The men and boys were put in the ranks; the women were told off to be wives (!) of the soldiers."

The "(!)" is in the printed text, and possibly represents Dr. Birkbeck Hill's amazement at the hero's decision. A few lines below is another passage: "When

I had just begun this letter another caravan, with two slave-dealers and seventeen slaves, was brought in, and I hear others are on the way. Some of the poor women were quite nude. I have disposed of them in the same way, for what else can I do?"

Contact with the less developed races undoubtedly tends to the blunting of the moral sense in civilized men, but this fact offers no excuse for Gordon. He refused, though urged, he says, "by a *Reverend*," to shoot the slave-dealers taken red-handed in these two instances, because there was no law to justify the act. He is regarded as a man of the highest type, and some writers, more familiar with names than with facts, have not been ashamed to speak of him as a Sidney or a Bayard.

Nevertheless, there are thousands of Englishmen in command, comparatively unknown men, who would die rather than be guilty of the brutality that Gordon confesses without a sign of remorse. It is by men of this stamp, in every nation, that the real work of civilization is to be done in Africa.

THE MAP OF THE TRANSVAAL.—Mr. Fredk. Jeppe, F. R. G. S., has lately brought out a map in four sheets on a scale of 15.78 miles to the inch, showing the South African Republic and the adjacent territories. The map is based on a number of authorities, official and other, and is a most creditable piece of work in style and appearance; but it has called forth a solemn protest from the Lisbon Geographical Society in a letter dated 31st July, 1889.

According to this letter the western boundary of the

Portuguese province of Mozambique is arbitrarily pushed at least half a degree too far to the east ; and this assertion is rather supported than contradicted by the legend inscribed on the boundary line : " Approximate Western Limit of Portuguese Possessions." In such cases the approximation is never made at the expense of the greater Power, actually or prospectively in possession, and the protest of the Lisbon Society ought to be recorded.

THE ERUPTION OF BANDAI-SAN.—*The Journal of the College of Science, Imperial University, Japan*, Vol. III., Part II., is wholly devoted to an account of the Bandai-san eruption of July 15, 1888, by Profs. S. Sekiya and Y. Kikuchi.

Bandai-san (Lat. $37^{\circ} 36' N.$, Long. $140^{\circ} 6' E.$) is one of a number of volcanoes, active and extinct, in the province of Iwashiro. The district about the mountain is made up of tufaceous deposits and sheets of volcanic rock. On the south side of Bandai at an elevation of 1,600 ft. above the sea is the lake Inawashiro, one of the largest in Japan, not a crater lake, but fed, before the eruption, by the river Nagase. The upper course of this river was stopped by the masses thrown out by the volcano, and the lake is now supplied by a tributary stream, the Sukawa.

On the morning of July 15, 1888, the weather was fine, with a gentle breeze. Soon after 7 o'clock, curious rumblings were heard, followed by an earthquake which lasted more than twenty seconds, and at 7.45 the eruption took place. There were fifteen or twenty explosions, accompanied by dense columns of dust and steam.

At the foot of the mountain there was a rain of hot, scalding ashes, with a pitchy darkness. A little later, the darkness continuing, a smart shower of warm rain fell for about five minutes; and then a mighty avalanche of earth and rock rushed at terrific speed down the mountain, buried the Nagase valley and its people and devastated an extent of 27 square miles.

The destructive agency was merely the sudden expansion of imprisoned steam, unaccompanied by lava flows or pumice. The eruption may be compared to the firing of a tremendous gun, such an one as can only be forged by Nature.

Terrible wind blasts swept every growing thing before them. In one field of rice on the southeast of the volcano "the slender stalks were laid flat upon the ground as evenly and regularly as if they had been combed down in parallel lines. Not a stalk lay across its neighbours. The heads of rice in one furrow covered the roots in the next furrow."

After the eruption immense numbers of holes of various sizes were remarked on the mountain slopes, and the origin of these holes has been a matter of discussion among the scientists. Prof. J. Milne believes that they were caused by the earthquake shocks; but Messrs. Sekiya and Kikuchi refer them to the falling stones and fragments of rock. A number of the holes were dug open and at the bottom of each was found a mass of rock or a stone. This should seem to be decisive, though merely circumstantial, evidence.

The form of the crater is now that of a horse-shoe, open towards the north. From east to west it measures 8,080 ft., and from north to south 7,460. The original

height of the mountain (Kobandai, or Little Bandai) is not accurately known, but it is believed to have been about 6,037 ft. The crater-bed is 3,839 ft. above the sea, and the undestroyed southwestern part of the mountain rises 1,658 ft. above the crater. The portion that was blown away must therefore have had an altitude of 2,198 ft. above the crater. With this went also 540 ft. from the top of the southwestern wall that remains.

Ten full-page plates illustrate the *Journal*.

THE FOREIGN TRADE OF CHINA.—The *Returns of Trade and Trade Reports for the Year 1888*, published by order of the Inspector-General of Customs, show a stationary condition for the years 1876–1886, followed by a marked increase both in export and import values for 1887 and 1888. For the eleven years first named the average total was 150,131,120 *Haikwan* Taels (1 Hk. Tl. = \$1.15). For 1887 the amount was 188,123,877, and for 1888 217,183,960 Hk. Tls. The Customs Revenue rose likewise from an average of 13,607,271 Hk. Tls. for the eleven years to 20,541,399 for 1887, and 23,167,892 for 1888.

EXPLORATION OF THE OWEN STANLEY RANGE.—The *Scottish Geographical Magazine* for August publishes a telegram received by the Colonial Office from the Governor of Queensland, in these words: "MacGregor returned Port Moresby after most successful exploration crest Owen Stanley Range; named Mount Victoria, 13,121 ft.; new mountain north of Owen Stanley, 12,500, named Albert Edward; many other peaks of little lower elevation discovered and named."

Details of this achievement, promised by the Colonial Office, have not yet been received.

Mt. Owen Stanley is supposed to be the loftiest mountain of the Pacific, S. of the Equator, with the possible exception of Kinabalu, in Borneo.

Previous attempts at climbing Owen Stanley, though made by competent explorers, resulted in failure.

Sir William MacGregor was probably better supported and supplied than his predecessors.

TAPPENBECK AND DOULS.—These two courageous explorers have fallen almost simultaneously in Africa, while their work was hardly begun.

Lieut. Tappenbeck and his associate, Lieut. Kund, in their march overland through the Congo Valley, ran great risks from the hostility of the natives, but made their way safely, with mingled tact and firmness, to the Ikatta River. The story of their adventures is full of interest and excitement. They afterwards went to the Kamerun Colony and it was there that Lieut. Tappenbeck sickened with the fever, and died, late in July.

Camille Douls, who has perished by assassination in the Western Sahara, was but twenty-five years of age. He began his career as an explorer four years ago by landing on the coast of the Sahara in the guise of a Mussulman, and travelling in that character through the western part of the desert. His extraordinary command of Arabic saved him on more than one occasion, but there is little reason to doubt that he had in some way roused the suspicion of his fanatical guides in his attempt to reach Timbuktu. His last letter, written

from Tangier before starting, showed that he knew the dangers that lay before him.

Rapport présenté au Ministère de l'Agriculture, du Commerce et des Travaux Publics et à la Société de Géographie de Rio de Janeiro sur le Déplacement et le Transport du Météorite de Bendegó, de l'Intérieur de la Province de Bahia au Musée National par José Carlos de Carvalho Ancien-Officier de la Marine de Guerre Nationale. Rio de Janeiro, 1888. (from the Author.)

The meteorite of Bendegó was found in 1784, in the neighborhood of the little stream from which it takes its name. (Bendegó is the Portuguese form.)

An attempt was made the following year to remove the mass, but the cart on which it had been placed broke down and the stone was deposited in the stream. There it remained for a number of years, till it was visited in 1810 by a man of science, A. F. Mornay, who found on examination that it was composed of iron. He broke off with great difficulty a piece of several pounds' weight and sent it with a letter to Dr. Wollaston, who read the letter before the Royal Society in 1816, with a note of his own, giving an analysis of the fragment. It was found to be composed of: Iron 95.1 per cent.; Nickel 3.9 per cent.; and 1 per cent. of other substances.

Mornay gave the following measurements of the mass: Length, 7 ft.; width, 4 ft.; thickness, 2 ft. He estimated the contents at 28 cubic feet, and the weight at 14,000 pounds.

In 1887 the Geographical Society of Rio de Janeiro undertook to transport the meteorite to the National

Museum. The difficulties of the task were considerable. The unwieldy mass was to be carried a distance of 70 miles, over long slopes of 18 to 20 degrees and down inclines of 30 degrees in the Serra d'Acaru, and across a number of streams, some with very steep banks, to the railway station at Jacuricy. An iron waggon, of about a ton's weight, was built for the occasion, and the work was successfully accomplished, after many interruptions caused by bad weather and the breaking down of the waggon, in 126 days.

The Report, which is a large quarto in French and Portuguese, is illustrated by a photograph of the meteorite and a folding plan of the route travelled.

Esboço Geographico da Provincia do Paraná, por Sebastião Paraná, Rio de Janeiro, 1889. (from the Author.)

The province of Paraná is in southern Brazil, between São Paulo on the north and Santa Catharina on the south. It covers about 170,000 square miles and its limits are well defined by rivers on the north, west and south, and by the ocean on the southeast.

It is one of the four provinces towards which European immigration is most strongly attracted by the fertility of the soil and the salubrity of the climate.

Mr. Sebastião Paraná gives in his little book a brief and well-arranged description of the country, its mountains and rivers, its climate, vegetable and mineral products, and an account of its cities and towns.

The soil produces sugar, cotton, tobacco, coffee, rice, tea, and in the highlands wheat and other grains. The tea culture is so general that many families raise the

leaf for their own use, and the Government has had it in view to extend the culture by establishing a colony of Chinese ; but Mr. Paraná rather approves the policy of the United States, "the model country on the question of immigration," in rejecting the Asiatics. He thinks at the same time that perhaps the Chinese might be accepted in Brazil "as a simple automaton for the work which is peculiar to him." A closer acquaintance with the automaton may show that he is not so simple as he looks.

Mr. Paraná's *Esboço* is his first essay in geographical work, and it is creditable to him.

Travels in the Atlas and Southern Morocco. A Narrative of Exploration. By Joseph Thomson, F. R. G. S. New York, 1889.

Mr. Thomson says in his preface that he has only recorded "something of what we saw and experienced in the parts in which we travelled."

This frank confession disarms criticism, though the reader may fairly enough object to the size of the book and the iteration of some experiences.

There is a little too much of Shalum the Jew, and the long palavers with the men in power are common incidents of travel in Mohammedan countries.

The suspicious fanaticism of the people defeated more than one of Mr. Thomson's purposes. He was able to penetrate but a little way into the Atlas Mountains, and the altitudes of peaks visited or seen are estimated rather than measured.

He gives to the Tizi-Likumpt, which he climbed, a height of 13,150 feet, and to the Tizi-n-Tamjurt, which

he takes to be the loftiest point of the Atlas, an elevation of not less than 15,000 feet.

It was in the central Atlas, on the Wad Agandice, that he discovered the most magnificent gorge he had ever seen, "such as may be found in America;" or, if Mr. Thomson would go there, at Les Causses, in France. "Imagine," he says, "a great yawning crack running right across a range of mountains. Picture yourselves at the bottom. On either side you look skyward over 5,000 feet of beetling cliffs and precipices, broken into by areas of extremely steep slopes and deep-cut crevices, and capped by fantastic rocky peaks and turret-like masses."

The city of Morocco disappointed the traveller. It covers a quadrangular space of about eight miles on a side, and the general dead level of the reddish, flat-roofed houses is broken only by the square minarets of the mosques, ten in number, which rise to the height of from 60 to 100 feet. Of these minarets one, the Kutubia, built of stone and 270 feet high, dominates the city and the plain around it for thirty miles, and is the most striking monument in all Southern Morocco, resembling and not unworthy to be compared with the Giralda of Seville.

The Moors were found to be dignified and courteous, though fanatical, cleanly in their habits, but false-hearted and morally corrupt beyond all other men; a sad distinction conferred upon them possibly by Mr. Thomson's perfervid genius, or his haste.

In the mountains and south of the Atlas the Jews are greatly oppressed, but in the towns and in Morocco proper they are the oppressors. They are largely gov-

erned by their own laws, administered by their own Sheiks, and with their own code of punishment. They are not liable to conscription, nor are they taxed for the support of the Kaids and the Sultan ; and their lives and property are comparatively safe. As money-lenders they divide with the Government, which plunders the people, the whole wealth of the country ; and when they suffer an injustice their cause is taken up by the representatives of the European Powers. Their way of life and their streets in the *Mellah*, or Jewish quarter, are foul in the superlative degree.

Excepting the Englishmen, whose hands are clean, the foreign agents in Morocco, says Mr. Thomson, drag the honor of the various nations in the mud by their traffic in the sale of "protections." Of all the sinners the Americans are the most shameless. They have no trade, no genuine subjects, no real or imaginary interest to look after, yet there is an American Minister at Tangier, besides Vice-Consuls, mostly Jews, in the chief coast towns. "Nay, more ;" he adds, "America does not hesitate to make a naval demonstration to compel the payment of bills run up in the Jewish fashion—a few paltry hundreds of dollars becoming in a year or two thousands upon thousands."

The American Minister at Tangier is a consul, and it may be true that he and the vice-consuls (if these exist) are something of a luxury. Nations, like peacocks, love to display themselves more or less shamelessly, but it is yet a comfort to know that virtue will not die out of the world so long as the English survive.

Even they, however, may be tempted too far, and it

would be cause for lasting and vain regret if the example of the American demonstration against Morocco led England, hitherto without reproach in such matters, to enforce at the cannon's mouth the payment of disreputable claims.

The book has many excellent illustrations, fine maps and a plan of the city of Morocco.

The History of a Slave. By H. H. Johnston, F. R. G. S., F. Z. S. London, 1889.

In this book Mr. Johnston attempts "to give a realistic sketch of life in the Western Sudan." He has endeavored, he says, to make his landscapes, architecture, implements, costumes, and studies of human types, as locally accurate as possible.

None but those who are acquainted with the Sudan can say how far this endeavor has been successful, but it is not too much to affirm that the book, or booklet, as Mr. Johnston calls it without a shudder, is a masterpiece. The story is told without effort and without exaggeration, and for naturalness Abu-l-Guwah belongs to the family of Robinson Crusoe.

The First Ascent of the Kasai: Being Some Records of Service Under the Lone Star. By Charles Somerville Latrobe Bateman, with Illustrations and Maps. New York, 1889.

Mr. Bateman was second in command of the expedition which escorted Calemba, the King of the Baluba, back to his native country. Calemba had descended the Kasai with Lieut. Wissmann, to see the Congo and the European establishments.

The author does not claim to have written a book of discovery.

He has wished to give a representation of places and things, climate, scenery and people ; and he has been careful to describe not merely the outward appearance of things, but the impression produced upon himself by the circumstances which occurred and the scenery through which he passed. He has endeavored to expose the covert slave-trade carried on by the Angolese subjects of Portugal, and this is well ; but is there no slave trade open, or covert, in other European colonies, or African States controlled by Europeans ? Mr. Bateman does not reason very soundly on the slavery question. He says : “ It is but right that I should draw attention to the difference existing between slave-owning and slave-dealing. So far as I can see, slavery must exist in the regions watered by the Congo and its tributaries for a very long period to come ; its suppression, were it possible, would lead to anarchy and misery without conceivable limits. But slave-dealing is quite another matter.” . . .

If this means anything, it means that you may have slaves, but you must not buy them. There are, perhaps, but three other ways of acquiring this desirable property ; a man may inherit slaves, or he may raise slaves, or he may go out and hunt them. These, then, are laudable methods, but to buy the property is sinful, because there must be a dealer to sell it.

Mr. Bateman saw nothing that interested him or struck him as being specially hopeful in the composition or conduct of the Baptist and other Reformed Missions in the State.

This negative condemnation is itself reduced to nothing by the mention of one Baptist missionary who was devoted to his work to the point of helping Mr. Bateman through an illness.

The natives were generally friendly and the voyagers stopped long enough at various points to devote some study to the tribes and their ways of life. Among the many illustrations from Mr. Bateman's drawings there are types of the Basongo-Meno, the Bakété, the Zingas and others, with representations of their weapons and implements; and among the portraits is one of Senhora Caxavalla, a genuine African beauty. Fine colored views give a lively idea of the scenery.

A permanent record of the trip was made by the establishment of the Luebo Station at the confluence of the Luebo and Lulua rivers.

The Geography of the Sea. By Lieut. George L. Dyer, U. S. N. In Charge U. S. Hydrographic Office, Navy Department. (from the Author.)

Lieut. Dyer, as one of the Vice-Presidents of the National Geographic Society, of Washington, is charged with the duty of making an Annual Report on matters that fairly come under the head of the "Geography of the Sea," according to the classification adopted by the Society. The present pamphlet is his first Report, and he has thought it advisable to give a "brief outline of the progress made in our knowledge of the sea since 1749, when Ellis reported depths of 650 and 891 fathoms off the northwest coast of Africa." In fact it was impossible for Lieut. Dyer, considering the restricted space at his command, to do more than hint at the

results accomplished in oceanography by the untiring industry of the scientific men of every nation. It is a service done to call public attention to these results, and the somewhat extended notice of the work done by the U. S. Coast and Geodetic Survey Steamer *Blake* will undoubtedly attract many, for whom the sea as the common highway of mankind has but little interest.

What is known as to the temperature, the chemical composition, and the relative depths of the ocean is set forth in three or four pages.

Le Projezioni Cordiformi Nella Cartografia per M. Fiorini. Roma, 1889. (from the Author.)

This pamphlet, reprinted from the *Bollettino* of the Italian Geographical Society for July, 1889, is intended as a supplement to previous writings of Prof. Fiorini's on the subject of the cordiform, or heart-shaped projections, so much in favor with the cartographers of the XVIth Century. The invention or, at least, the suggestion of this form is ascribed by the writer to Bernardus Sylvanus, of Eboli, from whose maps the idea was taken and improved by Werner, who was followed by others, as Orontius Finæus, Vadianus and Mercator. The last brought out in 1538 his double-heart-shaped map of the world, the *Orbis Imago*, of which the only known copy is now in the library of the American Geographical Society. Prof. Fiorini gives the history of this unique map, discovered by the late James Carson Brevoort in a copy of the *Tabulæ Geographicae Cl. Ptolemaei*, published by Mercator in 1578. Reproductions of the *Orbis Imago*, with modifications of the inscriptions and the omission of the dedication, were published

at Rome, by Lafreri and by Salamanca, "two real plagiarists," says Prof. Fiorini, who simply appropriated the work of Mercator.

The most remarkable of all the cordiform maps still in existence, is the Turkish Mappamundi, described by D'Avezac. This is engraved on six (not four) wooden tablets, found in 1795, in the Archives of the Council of Ten, at Venice, and now preserved in the Library of St. Mark. When discovered, the tablets were in good condition, and twenty-four copies of the map were worked off from them; but they are now past service. The date of the work is 966-967 of the Hegira (1558-1560, A.D.).

The maker of the map was Hadji Ahmed, a native of Tunis, who studied mathematics at Fez, then a centre of Mohammedan learning. He was captured by the Christians and sold to a gentleman, who allowed him to pursue his studies.

His work is evidently modelled on that of Finæus, but it is no servile imitation. Hadji Ahmed rearranged the intervals of the parallels and the meridians, and introduced, as Prof. Fiorini points out, a number of improvements. He added many names, and corrected the outlines of the coasts of the New World, on both oceans; and he represented the northern regions with a nearer approach to exactness than Finæus.

There are four copies of the Turkish map: one in the Library of St. Mark, another in the Seminario of Sta. Maria della Salute, a third in Prince Metternich's library at Vienna, and the fourth in the Correr Museum, at Venice. This last was brought to light during the present year in a volume, containing a number of miscellaneous wood engravings.

The Library of St. Mark possessed, up to the year 1865, a second copy of this precious work, bound in a volume for the use of students ; but it has disappeared.

The copy just found in the Correr Museum is certainly not the lost one, for the volume of engravings was bound by Lazzari, who died in 1864.

The cordiform projection did not stand the test of time. The first Mappamundi in this style was published in 1531, the last in 1566. According to Prof. Fiorini cartographers were led to abandon this shape on account of the great linear and angular alterations unavoidable in it.

Note.—In an appendix, on p. 676 of the *Bollettino* for August, received just before going to press, Prof. Fiorini reports the discovery of the missing Turkish map at the Library of St. Mark. Cav. Castellani, the librarian, writes on the 10th of August :

“After the receipt of your last letter we continued the search for the second copy of the Turkish map ; and yesterday it was found in a bookcase under the systematic catalogue, where it must have been put by my predecessor. . . . With the map was Assemani's *Dichiarazione*.”

There are, therefore, five copies of the map in existence.

Annuario dell' Istituto Cartografico Italiano, fondato il 1 Gennaio, 1884. Anno Terzo e Quarto. Roma, 1889. (from the Institute.)

The Italian Cartographical Institute is a private enterprise, supported by its own efforts and well supported, if the work of less than five years is judged on its merits. In that time it has published an original map of Assab and the neighboring country, a map of the Egyptian Sudan with the Red Sea Coasts as far as Assab, a map of the Alps near Susa, a map of the Italian possessions and protectorates, a map of the Italian railways, and an Elementary Atlas, besides the *Annuario*, which contains original articles on geograph-

ical subjects. The contents of the present very handsome volume are: Introduction, by G. Dalla Vedova; Cartographic Curiosities, by M. Fiorini; The Question of the Name of America, by F. Porena; The Difficulty of Determining Exactly a Difference of Longitude in Close Proximity to the Poles, by E. Millosevich; A Method of Giving Greater Exactitude to Measurements of Distances on Topographical Maps, by G. Govi; The History of Geography in Italy, With Particular Reference to the Catholic Missions and the Institute of "Propaganda Fide," by G. Pennesi; Brief Notes on the Geographical Institute of Justus Perthes, at Gotha, by G. E. Fritzsche; New Orometrical Formulas for Determining the Mean Elevation of a Crest and its Mass, by G. Ricchieri; Work of the Italian Cartographical Institute in Recent Years, by G. E. Fritzsche. The last two papers are illustrated by folding maps.

La Letteratura degl' Indigeni Americani, per Ferdinando Borsari, Napoli, 1888. Una Pagina di Storia Argentina per F. Borsari, Napoli, 1888. (from the Author.)

The first of these two publications is a lucid sketch of what is known concerning the native American literature, which Prof. Borsari takes to be worthy of serious attention on account of its human interest. His essay is marked throughout by a soberness of tone and a critical good sense, too often wanting in the notices of American literature, as in those of American archæology. He closes with a suggestion for the formation of an Italian Society of Americanists, and it cannot be

doubted that the scholars of the Peninsula will act on the suggestion.

The second publication gives in a few pages the story of the conquest of the Pampa, from the day in 1855 when Col. Bartolomé Mitre (inspired, possibly, by the example of Sir Charles Napier, setting out the year before to take Cronstadt "with sharpened cutlasses"), declared that he would protect the tail of the last cow in the province, to the scientific and vigorous campaigns of Gen. Julio A. Roca, who put an end to the Indian question in the Argentine Republic. This page of history teaching by example has its special application to the problem now before Italy in Abyssinia, and Prof. Borsari has evidently not looked beyond this; but Americans, remembering their own half-hearted and spasmodic dealings with the Indians of the United States, may see themselves as others see them in one sentence that describes the Argentine policy before the coming of Gen. Roca: "One day military expeditions were sent against the Indians, and the next money and gifts of every kind were lavished upon them to buy their good behaviour."

TITLES OF PAPERS IN GEOGRAPHICAL JOURNALS.

AMSTERDAM.—*Kon. Nederlandsch Aardrijkskundig Genootschap, Tijdschrift.*

Advance in the knowledge of the Globe during 1888—Fifty-eighth Meeting of the Kon. Ned. Aardrijkskundig Genootschap—Junction of the Amu-Daria with the Caspian Sea—Letter of Prof. A. Wichman to the Council—Eruption of Tandikat, Sumatra.

BERLIN.—*Gesellschaft für Erdkunde, Verhandlungen.*

- A Monument to Adolph Schlagintweit—Description of Assam and Upper Assam—Stanley's Emin Pasha Expedition—Schweinfurth's Letter to Ascherson on Southern Arabia—Dr. Boas's Journey in British Columbia—Third Report of Dr. Hettner on his Travels in Peru and Bolivia.

Zeitschrift.

Suggestions for a Travelling Equipment for Eastern and Central Africa—Remarks on Wertheman's Map of a Portion of the Amazonas Province (Peru)—Diary in Banda, Timor and Flores—The Central Plateau of France—Astronomico-geographical Determinations of Places and Magnetic Observations in Kaiser Wilhelm's Land and the Bismarck Archipelago—Map of Flegel's Route—Explanations for the Map of the Kaiserin Augusta River.

Deutsche Kolonialzeitung.

Prince Bismarck and the German Colonial Policy—Dar-es-Salaam—Farini and the Kalahari Desert—The Germans in California—The German Colonial Development—Report of the Imp. Commissioner Wissmann on the Storming of Bushiri's Camp—Colonial Agitation—The Anti-Slavery Congress—The German Emin Pasha Expedition—The Yerba Maté—The English Government and the English—The Problem of the Germans in Latin and Anglo-Saxon America—The Trial of Dinizulu.

BRUSSELS.—*Société Royale Belge de Géographie, Bulletin.*

The Congo Railway—African Gum Copal—The Influence of Geographical and Social Characteristics in the United States.

Le Mouvement Géographique.

The Congo Railway—The Volta Basin—The International Control (of the Congo State)—Congo Commercial and Industrial Company—Exploration of the Lomami—Exploration of the Lulonga—The French Traveller Trivier on the Upper Congo—Lieut. Dhanis on the Upper Congo—The Congo Red Cross Society—Matadi as a Seaport—Explorations by the Steamer *Roi des Belges* in Tippu-Tip's Country.

BUENOS AIRES.—*Sociedad Geográfica Argentina, Revista.*

Pronunciation and Spelling of Geographical Names—Products of the Province of Buenos Aires—In Lapland.

Instituto Geográfico Argentino, Boletín.

Tenth Anniversary of the Institute—President's Address.

CAIRO.—*Société Khédiviale de Géographie, Bulletin.*

Travels in the Southern Galla Country and the Land of Sydama.

EDINBURGH.—*The Scottish Geographical Magazine.*

The Cocos-Keeling Islands—South-American Rainfall South of the Tropics—Scientific Earth Knowledge as an Aid to Commerce—Tridacna Pearls—A Note on Some Astronomical Observations taken upon a Journey from Quillimane to the North Extremity of Lake Nyassa—The Geography of the Caucasus—The

Province of Elizavetopol—Great Britain and Portugal in East Africa—Journey across the Inland Ice of Greenland from East to West—On Marine Deposits in the Indian, Southern and Antarctic Oceans—The Zambezi Delta—On The Achievements of Scotsmen during the Nineteenth Century in the Fields of Geographical Exploration and Research.

FLORENCE.—*Sezione Fiorentina della Società Africana d'Italia, Bullettino.*

The Mahdi—Statistical Notes on the Italian Possessions on the Red Sea—Our Native Soldiers at Massowah—The Sultanate of Opia (on the Eastern Coast of Somaliland)—Italy in Northern Africa—The Transvaal—Stanley's Expedition—Human Sacrifices at Funeral Rites and Cannibalism on the Congo.

GOTHA.—*Petermanns Mitteilungen.*

Erosion by the Action of Tides—Fitness of Central Asia for the Introduction of the Russian Life—On the Problems of Special Geography and their present Position in Geographical Literature—The Transcaspian Region in Relation to Archæology—Bokhara—The Middle Serra-Colonies in Rio Grande do Sul—Money in Africa—On River-Forks and their Relations to the Surface of the Country.

LISBON.—*Sociedade de Geographia, Boletim.*

Notes for a Monograph on the Samoan Islands (in French)—The Congo, Its Past, Present and Future—Agriculture in the District of Benguella—Contributions to the Cryptogamic

Flora of Northern Portugal (in French)—
Journalism at Macao—Portuguese Guinea—
Further Documents for the History of the
National Jubilee of 1880 (June 10, Celebration
of the 300th anniversary of Camoens' Death).

LONDON.—*Royal Geographical Society, Proceedings.*

Exploration of the Welle-Mobangi River—The
Congo and the Ngala and Aruwimi Tribu-
taries—Further Explorations in the Caucasus
—The Annual Address on the Progress of
Geography: 1888-89. (Gen. R. Strachey, R.
E., F. R. S., President)—A Visit to the Gla-
ciers of Alaska and Mount St. Elias—Journey
Across the Inland Ice of Greenland from East
to West—The Local Distribution of the Tribes
Inhabiting the Mountains of Northwest Mo-
rocco—Explorations in the Region of the
Upper Gascoyne and Ashburton Rivers, West
Australia—Colonel Labre's Explorations in the
Region between the Beni and Madre de Dios
rivers and the Purus—Geographical Educa-
tion: The Year's Progress at Oxford—New
Guinea: Narrative of an Exploring Expedi-
tion to the Louisiade and D'Entrecasteaux
Islands—Expedition to the Cockscomb Moun-
tains, British Honduras—The Geographical
Congress in Paris.

Nature.

The Zoological Results of the *Challenger* Expedi-
tion—Coral Reefs: Letters to the Editor—
The Terrestrial Globe at the Paris Exhibition
—The Influence of Snow on the Soil and

Atmosphere—Recent Researches into the Origin and Age of the Highlands of Scotland and the West of Ireland—The Floating Island in Derwentwater (found to be a peaty mass)—The Forest Flora of New Zealand—British Rainfall, 1888—St. Elmo's Fire on Ben Nevis.

MADRID.—*Sociedad Geográfica, Boletín.*

A Trip to the Pyrenees—The River Muni Question—Attractions and Tides—Ancient Notes and Suggestions for a Canal by way of Nicaragua.

Revista de Geografía Comercial.

The Duty of Spain in Africa and the Campaign against Slavery—Spanish Trade with Morocco—The Italians in Morocco—The Province of Lérida—Slavery in Morocco—The Spanish Anti-Slavery Society at Barcelona—Spaniards in Algeria—Spanish Colonization in the Philippine Islands—The Lapps.

MANCHESTER.—*Journal of the Geographical Society.*

Austral Africa: Extension of British Influence in Trans-Colonial Territories—Liberia—The Meteorology and Climate of Suez before and after the Opening of the Canal—Russian Railways in Asia—A Russian Pacific Railroad—A Holiday in East Africa—The Republic of Paraguay—Commercial Geography.

MILAN.—*L'Esplorazione Commerciale.*

The Province of Santa Fé (Argentine Republic)—Italian Travellers—Buddha and His Doctrine—Relations of Italy with Abyssinia—The Rearring of Ostriches—Trees that produce India

rubber and Gutta Percha—Somaliland—The Southern Ports of Russia.

PARIS.—*Société de Géographie, Compte Rendu.*

The Cambodian Alphabet—Orthography of Native Names in Maps of the Sudan and of Senegal—A Work on Tavernier—Coudreau's Exploration of the Chain of the Tumuc-Humac—Artesian Wells in the Sahara—Missionary Station on Kilimanjaro—Cartography—The Balearic Isles—The Frontier of Tonkin and China—Travels of a Jansenist in Holland and Flanders in 1681—Present State of Oceanography in Norway and in Scotland—The Congress of 1889.

Bulletin.

The Euphrates Valley Railway—The Island of Réunion—Plan for the Creation of a Seaport and Naval Station at Cabourg (Department of Calvados).

La Géographie.

A Policy of Compensation—Our Commercial Interests and the Ministry for Foreign Affairs—Canada—Dismemberment of French Oceania—Senegal—The Revival of Geography in France—The Mediterranean—Madagascar—A Companion of La Pérouse—Among the Braknas (on the Senegal)—The International Congress in Paris—Consular Reform—Henri Coudreau—Tonkin—Contemporary Persia.

QUEBEC.—*Geographical Society, Transactions.*

Lake Mistassini—The Northern Boundary of the Province of Quebec—The Landfall of Cabot—

Atuatanas, or the Natives of Copper River—Belle Isle—(The following in French): Notes on Canadian Labrador—Notes to aid in the Development of Colonization and Commerce on the Banks of the St. Lawrence to the Frontier of Maine—The Primitive Races of North America—Winter Navigation of the Saint Lawrence—Distances from the Principal Sea-ports of North America to Galway, Liverpool, Havre, Havana and Rio de Janeiro.

RIO DE JANEIRO.—*Sociedade de Geographia, Revista.*

Journey of Exploration to the Sources of the Famous River Javary (1874)—The River Xingú—The Valley of the Rio Doce—South American Geographical Exhibition (at Rio de Janeiro, Feby., 1889)—The Whale Fishery in the Province of Bahia.

ROME.—*Società Geografica Italiana, Bollettino.*

The First Journey of a European from Assab to Shoa—The Present Reconstruction of Rome with Relation to its Past Transformations—An Excursion Across the Libyan Desert—Biographical Notice of Cristoforo Negri (on occasion of his 80th birthday, June 13)—Cordiform Projections in Cartography—The Gold Fields of South Africa.

VIENNA.—*Kais. Königl. Geographischen Gesellschaft, Mittheilungen der.*

The Development and Topography of the Rosetta Mouths of the Nile—Report on the Teleki Expedition to Central Africa—The President's Report for the Year 1888—The Work of the

Austrian State Institutions—The Mountain System of the Balkan Peninsula—Hydrography of the Samburu Lake Region—Hypsometry of the Southern Tyrolese Highlands and the Venetian Alps—Briccius : an Historical Fresco from the Goldtauern—The Trias of the School-maps of Lower Austria—The Middle Congo.

Deutsche Rundschau für Geographie und Statistik.

The Eighth German Geographical Congress—Travels in the Crimea—Vegetable Diet among Peoples of the North—Progress of Geographical Exploration and Travel in 1888—Norfolk Island—Physical Science as a Basis for Economical Geography—The United States of Venezuela—The Seismic Problem—The European Movement against the Slave Trade—The Valley of the Middle Waag (tributary of the Danube)—The Chiem See (in Bavaria) and its Swamps and Moors.

WASHINGTON.—*The National Geographic Magazine.*

Annual Address of the President : Africa, Its Past and Future—Reports of the Vice-Presidents : Geography of the Land, Geography of the Sea, Geography of the Air, Geography of Life.

WASHINGTON LETTER.

WASHINGTON, September 15, 1889.

The office of Superintendent of the United States Coast and Geodetic Survey, has been held for seventy-three years by men of great eminence. Here is the record :

Ferdinand Rudolph Hassler, 1816-1843.

Alexander Dallas Bache, 1843-1867.

Benjamin Peirce, 1867-1874.

Carlisle Pollok Patterson, 1874-1881.

Julius Erasmus Hilgard, 1881-1885.

Frank M. Thorn, 1885-1889.

Thomas Corwin Mendenhall, 1889.

It is one of the most distinguished scientific appointments in the country, and the recent selection of Prof. Mendenhall is considered an eminently proper one.

Born in Ohio, in 1841, Mr. Mendenhall was elected in 1873 professor of physics and mechanics in the Ohio State University. In 1878 he accepted the professorship of physics in the University of Japan, but resumed his chair in the Ohio State University in 1881, and in the following year organized the Ohio State Weather Service of which he was Director until 1884. In that year he was appointed professor in the United States Signal Service at Washington, where he remained until 1886, when he accepted the presidency of the Rose

Polytechnic Institute at Terre Haute, Indiana. In 1889 he was President of the American Association for the Advancement of Science. His printed contributions to science are numerous. He carries the degree of Ph. D. from the Ohio State University, and that of LL.D. from the University of Michigan.

There is a large amount of geographic information contained in the 136 quarto pages of the Report on the Sounds and Estuaries of North Carolina with reference to oyster culture, by Francis Winslow, U. S. Navy.* For the first time we have a description in detail of the outlying region and intricate coast of North Carolina. The areas, depths and lengths of the twelve sounds and numerous bays, rivers, inlets and creeks are minutely stated. It was in consideration of hydrographic data to be incidentally added to the archives of the Coast Survey, and for other reasons that a party was placed under the command of Lieut. Winslow in 1886, to aid in the development and definition of areas adapted to the cultivation of oysters in the sounds and estuaries of North Carolina. In the report above referred to, which has been recently issued, the character of the work and the results attained are stated. Within the brief period of less than three years nearly 600,000 acres of cultivable surface, capable of producing annually perhaps twice or thrice the product of the Maryland oyster beds in 1880 have been developed; fully 50,000 acres of which have already been taken up. The continued increase in the demand for oysters all over the country, and the continued diminution in the supply from the oyster-growing localities show that an increase of the productive area is

* U. S. Coast and Geodetic Survey : Bulletin No. 10.

not only desirable, but will prove a benefit to the people of the country at large. As Lieut. Winslow observes : " The ultimate results cannot be foreseen. But it is not unreasonable to predict that the few hundreds of dollars (\$1,786) expended on the investigation of Pamlico Sound and its tributaries will be the means, in the not distant future, of establishing an industry worth hundreds of thousands of dollars, employing many thousands of people, supporting many thousands more, and largely increasing the present supply of marketable oysters."

When Prof. J. Howard Gore of Columbian University began in 1885 a History of Geodesy, he found it very difficult at any time to be sure that the literature regarding the operations of a given period had been exhausted. So he deemed it best to collect titles as well as the works themselves. The various libraries in America were searched, and during two trips to Europe nearly every facility there was exhausted. Catalogues of libraries, however small, bibliographies of exact sciences, biographies of mathematicians, and trade lists of antiquarian books were carefully examined. In addition, a circular letter with an appended list of all his known works was sent to every living mathematician whose address could be obtained. The most notable accessions thereby secured were contributed by Col. John Herschel, R. E., who sent a manuscript supplement to his contribution to pendulum bibliography which was published in "Operations of the Great Trigonometrical Survey of India," Vol. V. This manuscript was found to contain seventy-two new titles.

The results of Prof. Gore's researches are embodied

in *A Bibliography of Geodesy*, a quarto volume of 200 pages, double columns; being Appendix No. 16 of the Report of the United States Coast and Geodetic Survey for 1887, just issued from the press. When it is announced that this work contains approximately 7,000 titles, it need not be added that it is a most notable bibliography. The author disclaims adherence to "all the refinements of bibliographic science," but nevertheless the work has been exceedingly well done. The insertion after the title of each work, of the name of the owner, or the depository where found is a feature that will be appreciated by those who have occasion to consult its pages. The claim made by Mr. Thorn in the Introduction that it is "the first work of its kind" will hardly stand. Prof. Gore himself cites other titles in his *Bibliography*.

It may be added that various overtures were made by foreign institutions desiring to publish this bibliography, but Prof. Gore having proffered the manuscript to the Coast Survey as the recognized American bureau of geodesy, the Superintendent gladly availed himself of the privilege of its preservation and publication.

CONGRESS OF THE THREE AMERICAS.—The gathering of the representatives of American nations at Washington on the 2d of October is an event of far reaching importance. Invitations have been sent to all the governments south of the United States, in pursuance of an Act of Congress approved May 24, 1888, by the terms of which the President is "requested and authorized to invite the several Governments of the Republics of Mexico, Central and South America, Hayti, San Domingo, and the Empire of Brazil to join the United

States in a conference to be held at Washington, in the United States, at such time as he may deem proper, in the year eighteen hundred and eighty-nine, for the purpose of discussing and recommending for adoption to their respective Governments some plan of arbitration for the settlement of disagreements and disputes that may hereafter arise between them, and for considering questions relating to the improvement of business intercourse and means of direct communication between said countries, and to encourage such reciprocal commercial relations as will be beneficial to all and secure more extensive markets for the products of each of said countries."

It is also provided in the act referred to that, in forwarding the invitations to the said governments, the President of the United States shall set forth that the conference is called to consider :

First. Measures that shall tend to preserve the peace and promote the prosperity of the several American States.

Second. Measures toward the formation of an American customs union, under which the trade of the American nations with each other shall, so far as possible and profitable, be promoted.

Third. The establishment of regular and frequent communication between the ports of the several American States and the ports of each other.

Fourth. The establishment of a uniform system of customs regulations in each of the independent American States to govern the mode of importation and exportation of merchandise and port dues and charges, a uniform method of determining the classification and valuation of such merchandise in the ports of each coun-

try, and a uniform system of invoices, and the subject of the sanitation of ships and quarantine.

Fifth. The adoption of a uniform system of weights and measures, and laws to protect the patent rights, copyrights, and trade-marks of citizens of either country in the other, and for the extradition of criminals.

Sixth. The adoption of a common silver coin, to be issued by each Government, the same to be legal-tender in all commercial transactions between the citizens of all of the American States.

Seventh. An agreement upon and recommendation for adoption to their respective Governments of a definite plan of arbitration of all questions, disputes, and differences that may now or hereafter exist between them, to the end that all difficulties and disputes between such Nations may be peaceably settled and wars prevented.

Eighth. And to consider such other subjects relating to the welfare of the several States represented as may be presented by any of said States which are hereby invited to participate in said conference. .

In the letter sent out to the diplomatic representatives of this country in the countries named, the Secretary of State says: " I have to call your particular attention to the scope and object of the conference suggested, which, as will be observed, is consultative and recommendatory only. The proposed conference will be wholly without power to bind any of the parties thereto, and it is not designed to affect or impair in any degree the treaty relations now existing between any of the States who may be represented. The topics for discussion and deliberation are manifestly of profound importance, and it is believed that a friendly and frank exchange of views in re-

lation to these subjects will be of practical use, and by mutual enlightenment will materially promote that expansion and intimacy of social and commercial relations which must be fruitful of blessings to all concerned.

“Certain topics are suggested as proper subjects for a comparison of views, but the field is expressly left open to any participant State to bring before the conference such other subjects as may appear important to the welfare of the several States represented.

“By direction, therefore, of the President of the United States, and in his name, you will tender to the Government of ——— a cordial invitation to be represented by such number of delegates as may seem to it convenient, at the international conference to be convened as aforesaid in the city of Washington, on Wednesday, the 2d day of October, 1889, it being understood however that in the disposition of questions to come before such conference, no State shall be entitled to more than one vote, whatever be the number of delegates it may send.”

Letters of acceptance have been received from the Governments of the Argentine Republic, Bolivia, Brazil, Chili, Columbia, Costa Rica, Equador, Guatemala, Hayti, Honduras, Mexico, Nicaragua, Paraguay, Peru, Salvador, Uruguay and Venezuela.

The Government of Santo Domingo declines to send delegates. The delegates to the conference on the part of the United States are John B. Henderson of Missouri; Cornelius N. Bliss of New York; Clement Studebaker of Indiana; T. Jefferson Coolidge of Massachusetts; William Henry Trescott of South Carolina; Andrew Carnegie of Pennsylvania; Morris M. Estee

of California; John F. Hanson of Georgia; Charles R. Flint of New York; and Henry G. Davis of West Virginia.

The proceedings of the conference will be mainly in the English and Spanish languages, although if the rule of similar bodies is followed, the representative of any government will make his motions and propositions in his native language on the theory that he can thereby better express the finer shades of meaning than in an unfamiliar tongue. Then translations will be made into English. The proceedings are to be printed by the Public Printer in the English, Spanish and Portuguese languages. This will provide for every body concerned except Hayti, whose language is French.

The second proposition, although surrounded by almost insuperable difficulties, is probably the most important. The tariffs in each country are varying and conflicting, so that possibly the only way of surmounting the numerous obstacles presented will be by negotiating reciprocity treaties, whereby products peculiar to one country may be admitted free into the others.

The adoption of silver coin to be a common legal tender (sixth proposition) is not regarded as of vital importance. If the markets for our products in South American countries, and the markets for South American products in the United States are opened, commercial transactions will be so enlarged that New York will take the place of London in the settlement of balances in our currency without the aid of a common coin.

Mr. Charles A. Flint has recently made some statements* as to the commercial condition of the countries

*Address before the Merchants' Club of Boston.

south of us, which aid considerably in estimating the importance of successful results from the proposed conference. 1. The population is about 50,000,000. 2. The aggregate foreign trade for 1888 valued in United States, gold coin was about \$1,200,000,000, of which our share was \$240,000,000. 3. We bought of them \$181,000,000, and sold to them \$69,000,000. 4. During the past twenty years our purchases from those countries have increased \$78,000,000, and our sales only \$12,000,000.

Before entering upon the discussions of the convention it has been wisely concluded to familiarize the delegates with the country by a personal inspection of our commercial and manufacturing centres. To this end they will leave Washington on the day following the opening for an extended tour through the eastern, northern, and western States, which will probably consume the time till November 14. The tour through the Southern States will be deferred until later in the season when the winter hotels are open. It is expected that the entertainment of the guests at points of debarkation will be provided by the localities favored. Numerous requests have been received at the Department of State, accompanied by liberal proffers from municipalities, boards of trade, manufacturers and others. No limit of time has yet been indicated, but it is probable that the congress will remain in session several months.

INTERNATIONAL MARINE CONFERENCE.—Under the provisions of "An act providing for an international marine conference to secure greater safety for life and property at sea," approved July 9, 1888, the President

of the United States was authorized to invite the government of each maritime nation to send delegates to a maritime conference, and to appoint seven delegates on the part of the United States.

These preliminary requirements have been complied with, and the following countries have thus far accepted invitations to participate: Great Britain, Germany, France, Italy, Denmark, Russia, Belgium, Mexico, Brazil, Chili, Costa Rica, Guatemala, Venezuela, Hawaii, China, Japan, The Netherlands, Nicaragua, Spain, Sweden and Norway, Uruguay and Honduras. The United States will be represented by a board of seven persons, and it is expected that the larger Powers will have the same number of representatives. The smaller countries, it is thought, will generally be represented by their Ministers here, assisted by one or more experts in the subjects before the conference. The American delegates are Rear Admiral S. R. Franklin; W. P. Sampson, Commander U. S. Navy; S. I. Kimball, Superintendent Life Saving Service; James W. Norcross, Master Mariner; John W. Shackford, Master Merchant Marine; William W. Goodrich, Counsellor-at-Law, and C. A. Griscom, President International Navigation Company.

The conference is to meet in Washington on the 16th of October.

It is declared in the act: "That it shall be the object of said marine conference to revise and amend the rules, regulations and practices concerning vessels at sea, and navigation generally, and the International Code of Flag and Night Signals; to adopt a uniform system of marine signals, or other means of plainly in-

dicating the direction in which vessels are moving in fog, mist, falling snow, and thick weather, and at night ; to compare and discuss the various systems employed for the saving of life and property from shipwreck ; for reporting, marking and removing dangerous wrecks or obstructions to navigation ; for conveying to mariners and persons interested in shipping, warnings of approaching storms, of dangers to navigation, of changes in lights, buoys, and other day and night marks, and other important information ; and to formulate and submit for ratification to the governments of all maritime nations proper international regulations for the prevention of collision and other avoidable marine disasters.

The American delegates (with the exception of Mr. Griscom) convened under instructions from the Secretary of State, and in April last formulated a detailed programme of subjects to be considered, for transmission to the several Powers. The following is the order :

General Division 1. Marine signals or other means of plainly indicating the direction in which vessels are moving in fog, mist, falling snow and thick weather, and at night. Rules for the prevention of collisions and rules of the road.

1. Visibility, number, and position of lights to be carried by vessels : (a) Steamers under way. (b) Steamers towing. (c) Vessels under way, but not under command, including steamers laying cable. (d) Sailing vessels under way. (e) Sailing vessels towing. (f) Vessels at anchor. (g) Pilot vessels. (h) Fishing vessels.

2. Sound signals ; their character, number, range, and position of instruments : (a) For use in fog, mist, falling

snow, and thick weather ; as position signals for steamers under way ; for steamers towing ; for sailing vessels under way ; for sailing vessels towing ; for vessels at anchor ; for vessels under way but not under command, including steamers laying cable. (b) For use in all weathers as helm signals only ; for steamers meeting or crossing ; for steamers overtaking ; for steamers backing. (c) Whether helm signals shall be made compulsory or remain optional.

3. Steering and sailing rules : (a) Sailing vessels meeting, crossing, overtaking, or being overtaken by each other. (b) Steamers meeting, crossing, overtaking, or being overtaken by each other. (c) Sailing vessels meeting, crossing, overtaking, or being overtaken by steamers. (d) Steamers meeting, crossing, overtaking, or being overtaken by sailing vessels. (e) Special rules for channels and tide-ways, where no local rules exist. (f) Conflict of international and local rules. (g) Uniform system of commands to the helm. (h) Speed of vessels in thick weather.

General Division 2. Regulations to determine the sea-worthiness of vessels. (a) Construction of vessels. (b) Equipment of vessels. (c) Discipline of crew. (d) Sufficiency of crew. (e) Inspection of vessels. (f) Uniform certificates of inspection.

General Division 3. Draft to which vessels should be restricted when loaded. Uniform maximum load mark.

General Division 4. Uniform regulations regarding the designating and marking of vessels. (a) Position of name on vessel. (b) Position of name of port of registry on vessels. (c) Size of lettering. (d) Uniform system of draft marks.

General Division 5. Saving life and property from shipwreck. 1. Saving of life and property from shipwreck at sea. (a) Duties of vessels after collision. (b) Apparatus for life saving to be carried on board ship. (c) The use of oil and the necessary apparatus for its use. (d) Uniform inspections as to b and c. 2. Saving of life and property from shipwreck by operations from shore. (a) Organization of, and methods employed, by life-saving institutions. (b) The employment of drilled and disciplined crews at life-saving stations. (c) The maintenance of a patrol upon dangerous coasts by night, and during thick weather by day, for warning off vessels standing into danger, and for the early discovery of wrecks. (d) Uniform means of transmitting information between stranded vessels and the shore. (e) Lifeboats, life-saving apparatus and appliances. 3. Official inquiries into causes and circumstances of shipwrecks and other casualties.

General Division 6. Necessary qualifications for officers and seamen, including tests for sight and color blindness. (a) A uniform system of examination for the different grades. (b) Uniform tests for visual power and color blindness. (c) General knowledge of methods employed at life-saving stations. (d) Uniform certificates of qualification.

General Division 7. Lanes for steamers on frequented routes. (a) With regard to the avoidance of steamer collisions. (b) With regard to the safety of fishermen.

General Division 8. Night signals for communicating information at sea. (a) A code to be used in connection with the International Code Signal book. (b) Or a supplementary code of limited scope to convey infor-

mation of special importance to passing vessels. (c) Distress signals.

General Division 9. Warning of approaching storms.

(a) The transmission of warnings. (b) The uniformity of signals employed.

General Division 10. Reporting, marking, and removing wrecks or obstructions to navigation. (a) A uniform method of reporting and marking dangerous wrecks and derelicts. (b) The division of labor, cost, and responsibility among the several maritime nations, either by geographical apportionment or otherwise, of the removal of dangerous derelicts, and of searching for doubtful dangers with a view of removing them from the charts.

General Division 11. Notice of dangers to navigation. Notice of changes in lights, buoys, and other day and night marks. (a) A uniform method of taking bearings, of designating them (whether true or magnetic), and of reporting them. (b) A uniform method of reporting, indicating, and exchanging information by the several maritime nations—to include the form of notices to mariners. (c) A uniform method of distributing this information.

General Division 12. A uniform system of buoys and beacons. (a) Uniformity in color of buoys. (b) Uniformity in numbering of buoys.

General Division 13. The establishment of a permanent international maritime commission. (a) The composition of the commission. (b) Its powers and authority.

The board has sent out letters to many sources, asking for information on the subjects to be considered, and

bundles of it have been received from the Light-house Board and the Chief Signal officer of the army.

The proceedings of the conference will be in the English language, but representatives will make their motions and propositions in their own language.

The programme proposed is not binding upon the conference, but probably will be adopted. The act authorizing the conference expressly forbids the consideration of commercial matters.

The following named nations have declined to participate in the proceedings of the conference: Greece, Roumania, Liberia, Peru, Paraguay and Colombia.

The claim is made, and probably not contested, that the Maritime Exchange, of New York, has the honor of originating this remarkable conference. It formulated the bill and urged its passage in Congress, and furthermore, when Great Britain at first declined to come into the conference, brought about a compromise on certain points, so that Great Britain consented to send delegates.

GREAT CIRCLE SAILING.—The actual state of the science of great circle sailing is presented in a recent publication of the U. S. Hydrographic office.* It consists of an exposition of graphical and analytical methods embodying cardinal principles relating to the great circle, as applied to navigation, and gives publicity for the first time to several of the most convenient and useful methods yet devised. The work is regarded as of high importance.

*The development of great circle sailing, by G. W. Littlehales. Under direction of G. L. Dyer, Lieut., U. S. N., Washington, 1889.

HOPE BANK AND RUM CAY.—Capt. Z. L. Tanner in his report of the work of the U. S. Fish Commission Steamer *Albatross* for 1886, just published, gives a narrative of his search for the supposed Hope Bank, which has occupied a position on Admiralty Charts in latitude $41^{\circ} 29' 28''$ N., and longitude $63^{\circ} 17'$ W. The cruise was made at the suggestion of Commander J. R. Bartlett, late Hydrographer, U. S. N., “for the purpose of determining the existence, and if possible the character of certain banks which are believed by some to exist, but which so far have not been properly examined.”

The first soundings began at latitude $40^{\circ} 14'$ N., longitude $65^{\circ} 56'$ W., in 2,224 fathoms. The line was carried to the eastward to latitude $40^{\circ} 20'$ N., longitude $64^{\circ} 54'$ W., in 2,575 fathoms, thence to the position assigned to Hope Bank, where eleven soundings were taken at intervals of five miles, the depths varying from 1,930 to 2,069 fathoms. At the position assigned to the Bank there was found a depth of 1,969 fathoms! The *Albatross* then proceeded to St. Johns, Newfoundland, and on the return voyage additional soundings were taken in depths varying from 1,644 to 1,943 fathoms to the northward of those taken on the outward trip, demonstrating beyond a doubt that no shoal or bank exists on the ground covered. Subsequently a line of soundings was run to the westward to George's Bank, without finding any indications of shoal water to the eastward of it.

Capt. Tanner assigns the following reasons for the hitherto supposed existence of the bank: “Reference to the chart (H. O. Chart 21a) will show its assigned position to be near the northern edge of the Gulf Stream,

where its deep blue waters with temperatures above the normal and high specific gravity, impinge upon the colder green water of the Arctic current. The first sight of this green water on emerging from the Gulf Stream gives one the impression that he has suddenly struck soundings. The bank once placed on the chart, the navigator who found himself in green water anywhere in that region during foggy weather, or when from any cause he was uncertain of his position, would conclude at once that he was in shoal water, and locate himself in the position assigned to Hope Bank. The difference in color and specific gravity between the waters of the Gulf Stream and the region adjacent varies with the seasons, and is more marked during summer and autumn when the fresh water from melting ice finds its way from the Arctic. The navigator passing over the region had neither time nor the means at hand for satisfactory investigation; therefore, he was forced to judge from appearances, which, we have shown, are deceptive."

In this same report will be found a sketch of Rum Cay, one of the Bahama group, probably identical with Santa Maria de la Concepcion, the second island touched at by Columbus, by Lieut. Commander James M. Forsyth, U. S. N., a native of the island. It is replete with interesting facts and reminiscences.

IRRIGATION.—Aside from the monthly reports of surveying parties scattered in various parts of the west, southwest and on the Pacific slope, there is nothing new in the matter of the irrigation of arid lands. A committee of the United States Senate, accompanied by Major Powell, is engaged in an extensive tour over

a large part of the western territory, and the newspapers of that region are loaded with irrigation literature. The last appropriation of a quarter of a million dollars has been apportioned between the topographic survey (\$120,000), the hydrographic survey (\$32,000), and the engineer survey (\$76,000). Capt. Clarence E. Dutton, U. S. A., is in charge of the engineering and hydrographic surveys, and Prof. Almon H. Thompson has charge of the topographic survey. That irrigation is now a matter of serious concern and that large sums of money will be expended upon it—and probably wisely—there cannot be a shadow of doubt. But more will be known about it after the next Congress convenes. Meanwhile surveys and maps are being made, gauging stations established, and lakes scheduled preparatory to their selection and withdrawal for use as reservoir sites.

The latitudes and longitudes of certain localities in Missouri, Kansas and New Mexico were determined in 1885-86 in connection with the geographic work of the Geological Survey. The names of these localities are Oswego, Elk Falls, and Fort Scott, in Kansas; Springfield and Bolivar, in Missouri; and Albuquerque in New Mexico. Mr. Robert S. Woodward has collected and discussed the results of this work in a recent Bulletin* of the U. S. Geological Survey. The same writer has contributed to the Survey a series of mathematical formulas and tables designed to facilitate the construction and use of maps.† In this connection may be mentioned Mr. Schott's report on heights from geodesic leveling between Mobile and New Orleans, being Appendix No. 9 of the

*Bulletin No. 49.

†Bulletin No. 50.

Report of the United States Coast and Geodetic Survey for 1887, just issued. Other Appendices of this Report are : Fluctuations in the level of Lake Champlain and mean height of its surface above the sea ; and the magnetic work of the Greely Arctic expedition ; both by Mr. Schott ; and Mr. Henry Mitchell's discussion of the movements of sands at the eastern entrance of Vineyard Sound.

THE ECLIPSE, 1889.—The United States Government will send an expedition to the west coast of Africa to observe the solar eclipse to occur December 21–22. The Navy Department has appointed a commission composed of Capt. R. L. Phythian, superintendent of the Naval Observatory, Simon Newcomb and Asaph Hall to devise a plan and make recommendations. The first step taken by this commission was to communicate with the United States consular officers on the coast of Africa to ascertain the usual conditions of the weather in December. This information is important in determining the location of observing stations. It is preferred to have the stations on the coast, but if the conditions there are unfavorable for observing, the parties may be sent inland. An examination of the path or belt of the eclipse as charted in the Nautical Almanac shows that the Guinea coast is about the only place where an expedition could be sent with fair promise of success. The belt within which the eclipse will be total extends across the continent of Africa, and passing over the Atlantic Ocean just grazes the northeast coast of South America. There is an island off the coast of French Guiana almost in the centre of the belt, but the eclipse occurs there a

little after sunrise, when the conditions for observing will be unfavorable. The period of totality there is only about two minutes. On the Guinea coast the eclipse occurs between 12 and 3 o'clock.

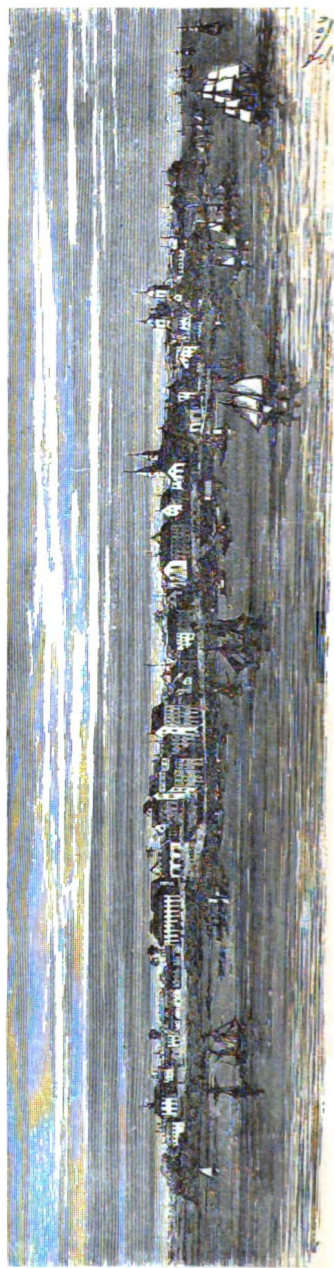
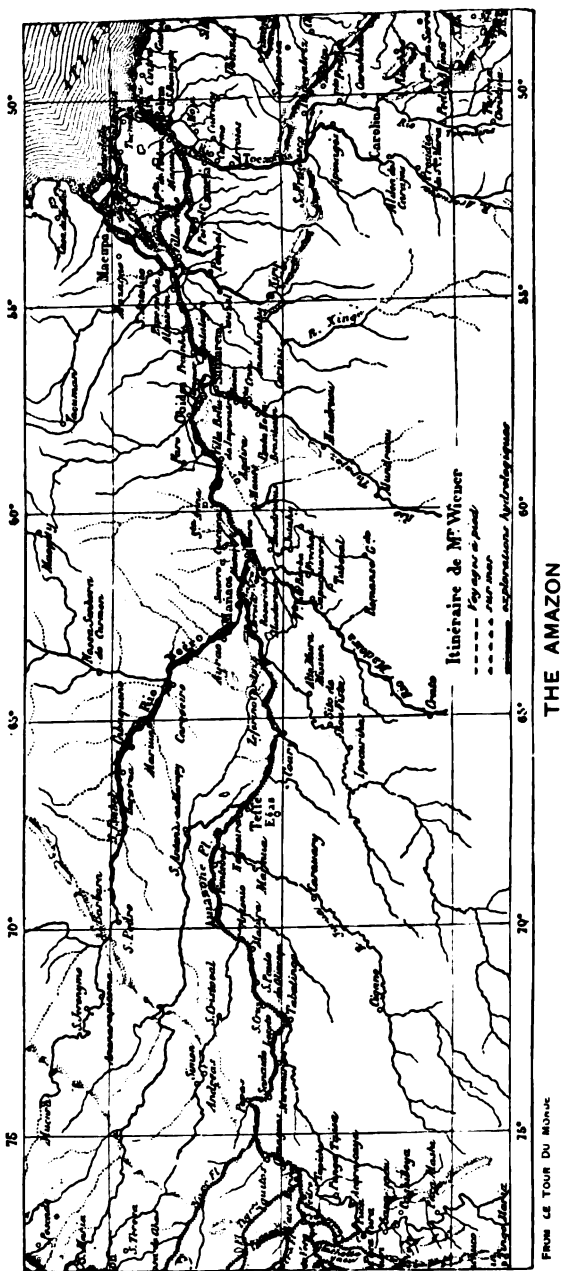
AN AFRICAN DISCOVERY.—Mr. Daniel F. Rankin, a private explorer, has made a very important discovery of a new opening in the Zambesi delta, connecting direct with the main stream of the Zambesi proper. The new opening is called the Chinge River, and is situated 45 miles south of the Quaqua River, on which Quillimane now stands. On the bar itself of the Chinge River at the lowest fall of the spring tides, there is a good three fathoms of water, with a channel some 500 yards wide and with good anchorage under shelter of the land. Mr. Ernest W. Smith, consul at Mozambique says: Hitherto commerce has been restricted and confined because of the difficulties attending the present route from the coast to the Zambesi, both at Quillimane and Inhemissengo, and it has been long felt that such a discovery was of the greatest necessity and importance to the development of the vast and rich regions drained by this waterway, and also of the greatest importance to the whole districts surrounding Lake Nyassa. At the present time all goods for the Zambesi River have to be brought up the Quaqua River (where there is only two and a half fathoms of water) to be landed at Quillimane for inspection at the custom house. From Quillimane the goods are shipped in lighters or canoes up the Quaqua River to a place called Mopea, four-and-a-half days' journey from Quillimane. At Mopea the goods are again unloaded and are

carried by natives for six miles through a swamp of two feet of water, to the Zambesi River, and from Senna or Tete, on the Zambesi, steamers connect with all points of importance in the lake districts.

By the new opening discovered by Mr. Rankin, vessels of from 500 to 600 tons burden can go direct from the sea to the Zambesi and thence to the Lake Nyassa districts without any change and with none of the bother now existing in connection with tides and seasons of the year.

The governor of the province, after having verified Mr. Rankin's discovery, requested the Portuguese home authorities to remove the seat of government of Quillimane from its present place on the Quaqua River, to the mouth of the Chinge River, and to order that henceforth all mail steamers call at the latter place instead of, as heretofore, at the former.

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PARÁ AND THE AMAZONS (IN 1888).

BY

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Ships going to Pará, as a general rule, lay their course so as to make a land fall at or near Point Salinas Light, the reason being that off the Point lies the pilot-boat. Salinas consists of a few houses and the light-house, and is about thirty miles to the southward of Bragança Shoal, which lies at the entrance of the Pará River. The pilots are all Indians, civilized, of course, and very good men in their way. They wear a blue uniform with brass buttons, and the sharpest of Brazilian sharp-pointed shoes, and altogether they are great dandies.

Having sighted Salinas and taken on our pilot about ten o'clock in the evening of a June day in 1888, our passengers were much surprised the next morning to find themselves rolling about outside Bragança Shoal, instead of being well up in the Pará River. It appeared that, being unable to find the light-ship stationed on the bank, the ship had come to anchor to wait for daylight. About five o'clock we commenced moving, and after several miles we passed a small Brazilian schooner at

anchor, which proved to be a temporary light-ship, the other being at Pará for repairs. This vessel at night showed a small light, visible, perhaps, three miles, whereas the shoal extended ten miles beyond. No trouble had been taken to send down word to the pilots, and ours, who had been on the station six weeks, was, of course, ignorant of any change.

As we moved up the river land began to appear on the south side, mostly a tangled mass of palms, with here and there a bit of sand gleaming in the tropical sun. The north shore is not visible till one gets quite a little way up, when the banks of Marajo Island appear, showing the same tangled mass of palms, vines and mangrove bushes, all struggling, fighting, killing each other even, in their endeavors to obtain a share of the life-giving sunlight. The river itself is full of yellow mud, which gives it a rather sullen look.

Standing on the bridge one begins to notice a faint, deliciously exhilarating perfume in the air, growing stronger the farther up the river we proceed. Take in all you can while you can, you will never have another chance unless you enter Pará River from the sea again. It does not exist in any of the other parts of Brazil and the breezes of Ceylon are the only things that approach it.

Small fishing boats pass by, rigged with two masts, and their bows and sterns at right angles to their sides, with the whole family as crew, most of them naked, their bronze skins glistening in the sun. Now and then a palm-thatch hut appears, and farther up several brick and tile factories, the houses painted many colors and with red tile roofs. The little round fort appears in

sight with a few antiquated guns frowning from the battlements, looking as if they would explode if they were fired. They were fired some years ago when the Emperor paid a visit to his northern capital, and it is said that no powder being forthcoming from the magazine or the town, the Emperor had to wait at the bar twenty-four hours while he sent up powder for his loyal, if careless, subjects, to salute him with.

A ship, on coming to anchor off Pará, is immediately surrounded by Portuguese boatmen, who, as soon as "pratique" is given, commence calling and shouting to the passengers to employ them in going ashore. Their boats are broad, very strongly built and capable of carrying great weight. Many of them are built in Portugal and imported into Brazil; those so built being considered stronger and better made. The boatmen themselves are almost entirely Portuguese, and as a rule are a very trustworthy and hard working lot of men. They come to Brazil with very much the same purpose that the Chinese have in coming to America, namely, to make enough money in a few years of hard and unremitting labor to enable them to return to Portugal and live in ease and enjoyment. They are very sober and frugal in their habits, and soon leave the water to become small shopkeepers and the like. Steam launches also come out filled with officials, foreigners, and the principal merchants of the place to look after business, but also to get iced drinks. Though there are so many foreigners in Pará, and so much foreign intercourse with the place, there is no ice made or imported there. There used to be an ice factory, but it died from lack of patronage; there not

being enough consumed by the foreigners to make it pay, the Brazilians using it hardly at all. It is rather trying on a freshly landed stranger to be in a place as hot nearly as New York in July or August and be unable to get a cool drink of water, beer, or anything, for love or money. It seems strange that the native water jars should not be made of porous clay like the "chattis" of India and, in fact, the Eastern world generally. After four or five days' enforced abstinence, however, one gets used to it, and after a month or six weeks ice is rather distasteful, if anything, or at any rate is not looked upon as a prime necessity.

The water opposite Pará is about a mile wide, but the other shore is several miles further, and not visible because of the large islands which intervene. In fact, between Manáos and the mouth of the Amazon the two banks are not seen save at Ita Coatiara and Obidos. It should be said here, perhaps, that the Pará is not a mouth of the Amazon, but rather of the Tocantins, although they are all connected by small channels. The tides here are so strong that at times it is impossible to pull boats against them, and it is at any time a difficult task. For this reason steam launches are in great demand, and all the shipping-houses have them. Steamers wishing to go to sea must always wait the flood tide.

To leave the shore at any time, permission must be had from the Custom-house officials, and after eight o'clock in the evening a small tax must be paid, in the shape of an internal revenue stamp, which must be delivered on board the guard-boat anchored in the stream.

The city of Pará, seen from the river, looks very

much like an Italian town. The Royal Palms (*Oreodoxa regia*) give it a tropical look, which it otherwise lacks. On the river side it has a sea-wall of solid masonry, extending the length of the town, and from this wall the wharves of the different steamboat companies are built. The better wharves (here called *trapiches*) are built of iron, with corrugated iron sheds upon them. To these wharves are moored numbers of river steamers, nearly hiding the whole front of the town. The squares lying along the water front are kept vacant as public parks; but nothing is ever done to them, and they are simply a tangled mass of uncut grass and weeds. Broken pieces of machinery, odds and ends, etc., lie in them, and have lain there for years. Indeed, in one square, the Praça da Constituição, lies a statue, full length on the ground, still in its wooden casing, just as it was shipped from Europe several years ago.

The streets are very narrow, so narrow, indeed, that there is hardly room for pedestrians to avoid the tramways that run in nearly all of them. They are quite well paved, with stone, and are kept remarkably clean. In some of them, however, the surface is very much curved, so that it is exceedingly uncomfortable to walk save in the very centre. The sidewalks are barely wide enough for one person, and are not considered a necessity.

South America is the paradise of tramways. No town of any importance, or which conceived itself to be of importance, would think of being without, at least, one; and they are very profitable, too; everybody rides in them to and from business, or the theatres or balls. Save the Ministers of State in Rio scarcely any one in

Brazil keeps a carriage, and even for pleasure in the cool of the late afternoon the trams are preferable. They are called *bondes* (singular *bond*), from the fact that the bonds of the first one built were peddled on the street corners in Rio, and the Brazilians, not understanding English, mistook that word for the name of the thing itself. The cars are built mostly in the United States, and are generally of the open summer pattern. The gauge varies from two feet upwards. The rails used are the groove rails, and if well laid offer the slightest possible obstruction to crossing vehicles. Mules are the motive power. They are brought from the south of Brazil or imported from the River Plate countries, where the breeding of them is quite an important industry. They are very small, not any taller, but perhaps a little longer than the *burro*, so common in Mexico and the adjoining regions. The usage they receive is not of the kindest, nor the care of the best, but still they seem to thrive remarkably well. They are driven at a rate never less than ten miles, and often considerably more, an hour. The drivers are of mixed Indian blood, and take great delight in tooting their horns at every street crossing, and in whooping it up around the very sharp curves. Indeed it seems sometimes a question whether one will get around the corner safely, or be flung out of the car. The fares are arranged according to distances, and are somewhat higher than those which obtain in the United States. The conductor, in return for one's fare, gives half of a perforated ticket, though on the different lines different systems are in use, as the bell punch, while on some the ticket is collected at the end of the journey, and on others no record is kept at all.

The buildings of Pará, as a general rule, are not very fine, the handsomest being the Cathedral, the Custom-house (formerly a convent) and the theatre. The Cathedral inside is rather bare, except at the altar, which has recently had a hundred thousand dollars spent on it. The effect on the whole, is gaudy and lacking in pleasing qualities. The theatre is one of the largest and finest in South America, and formerly was renowned for its acoustic properties, but these have been improved out of it by repairs recently finished. It stands in the middle of a large open square, so that one can get a fine view of it from all sides.

One of the things that first strikes a person newly landed in Brazil is the want of verandas. It would not be so strange, perhaps, if the Spanish *patio* were common to the houses, but that is almost never seen. In the country, some of the larger *fazendas* have verandas, though even these generally are but poor affairs. The sloping red tile roof is universal, and rightly so in so wet a climate. It is easily put on, easily repaired, easily taken off, and affords excellent shelter from the tropical down-pours. It may sound strange, but it appears to be true, if one can believe statements made by both foreigners and Brazilians in high public stations, that that property in a roof the most desired is the one which allows it to be easily taken off; as there is a law that forbids the eviction of tenants for the non-payment of rent, and the remedy most in use to surmount this difficulty is the removal of the roof by the landlord under the pretext of repairs, when the first shower generally produces the desired effect.

The interiors are bare, and in general devoid of com-

fort or pleasantness according to our notions. The floors, of course, are generally made of the various hard woods of the country, some quite ornamental, and stand wear and tear very well. The walls are, for the most part, bare, and show only a great blank, white space, with perhaps a few cheap prints of some kind (the Saints seem to be the most popular subjects) nailed up here and there. Usually there are no ceilings, but if the house be of more than one story, the top one has no ceiling, and thus a greater circulation of the air is created, and this is conducive to the coolness so much sought after in warm climates. In the drawing-room, placed sharp up against the wall is a sofa or lounge, from each end of which, and at right angles to it, extend rows of stiff-backed chairs (not necessarily of the same kind), facing each other, so forming an alley up to the sofa, where the host sits and receives. All drawing-rooms, from that in the palace down, have this arrangement of sofa and chairs. The houses that are otherwise furnished in the French fashion are exceptions, and occur only in Rio and one or two of the larger coast towns, as Bahia or Pernambuco. It is a very poor house indeed that does not have at least one piano in it. It has been estimated that there are more pianos in Brazil, in proportion to the population, than in any other country, Germany not excepted. There is as much bad music drummed there, perhaps, as anywhere else, but there is no prettier light music composed than in Brazil.

The women of the upper classes are rarely or never seen in the street, and in fact scarcely leave their houses, except to go to the theatre or to a ball. As for shopping, they buy from samples the shopkeeper sends to

the house, or from peddlers or hawkers sent out on the streets for that purpose. The latter is the more common way. These men attract attention by clapping two flat sticks together, which make a sharp, clear sound that can be heard quite a distance. The women of the middle classes seem to spend most of their time gazing through the windows or leaning near the balconies, in loose wrappers, and expectorating into the street below, regardless of passers by. People usually walk in the centre of the street.

Servants are very bad, very high priced, and very hard to get. The necessity of having to work to live never having become a stern reality in their eyes, they consider it rather a favor than otherwise, in fact, quite a condescension to do anything at any price. A cook, for instance, and not a good one either, who comes at half past eleven in the morning, cooks your breakfast, and leaves between half past six and a quarter to seven at night, after cooking dinner, expects and gets from seventy (70\$000) to eighty (80\$000) *milreis* a month, *i. e.*, at present rate of exchange, about from thirty-five to forty dollars. He does not wash his dishes and would leave the place in an instant if asked to do it. None of the servants sleep in the house where they work. They come in the morning and leave at night by eight o'clock at the very latest. They are much given to stealing, and if detected do not feel the slightest shame, but rather upbraid the master and act as if he had interfered with some of their prerogatives. On the whole, they are very unreliable, and one can never tell whether one will go without breakfast or without dinner.

For foreigners, living is very expensive; all the arti-

cles that we consider necessities being abominably high, and many of them even not to be had. Fruits are cheap, of course, but vegetables are very scarce. The food of the masses largely consists of dried native fish, salt fish imported from the United States, salt pork (called *toucinho*, and considered a great delicacy) and slabs of jerked beef. These, with rice and *farinha*, and one or two kinds of greens, are all the food one gets, except in towns like Pará, Santarem, and Manáos, and on the river steamers when a scanty allowance is given of potatoes and fresh meats.

The market of a tropical city is always an interesting and instructive sight. Here one may gain, perhaps, more actual knowledge of the minor products of a country, than from volumes of dry reports and statistics. The market of Pará occupies a building covering a whole square. The building is high and square, with an open court in the centre and roofed cloisters around the sides. On one side are the meat stalls, then, in no order, come fruit and vegetable stands, presided over generally by negresses, mulattoes, and women of various degrees of mixture of white, Indian and negro blood. One of the most common fruits is the blackberry of the Assai palm, looking like a large cherry. It is from these berries the celebrated drink of Pará, "Assai," is made. The berries are crushed in a bowl of water, with the bare hands, and then strained through a sieve of wicker work on to some fresh berries and the strengthened solution is strained again and ready for sale. It is considered a very healthful drink and is in great favor among all classes of the natives.

Right next to the market, in a sort of dock, lie num-

bers of trading schooners and small boats and canoes, brought from the interior by the Indians. Some of these come from as far as the provinces of Goyaz and Matto-Grosso. The voyage sometimes takes a month or two and as much or more to return. The crews are mostly of mixed blood, the Indian predominating. The cargoes consist of Brazil-nuts, mandioca and the like.

Almost all of the merchants and foreigners live in the suburb, Nazareth, which, being somewhat higher, is much healthier and cooler than the town. The best houses, as a rule, are on the Rua das Mangobeiras, so called from the beautiful trees which line each side of the street, almost meeting in the centre over head and forming a deliciously cool-looking and inviting promenade. In front of the houses are small gardens, conventional in style, filled with flowers and foliage plants, especially the latter, such as crotons, etc. This gives a very pleasing aspect to the rows of rather ugly houses. In the rear are enormous gardens, in which all kinds of fruits and vegetables that can be made to grow in the tropics are raised. Here, also, are kept the animal pets of all kinds, monkeys being far in the front as to numbers. The Barricudo monkeys are the greatest favorites, as they seem to be absolutely without any knowledge of biting; no matter how badly teased all they do is give a number of ear-piercing shrieks. The most curious animals are often to be seen as pets, such as *pacas*, *coatias*, *agoutis*, and even, though rarely, snakes.

The Brazilians are probably the most pet-loving people in the world, and their success in taming all kinds of creatures is incredible. The pets are treated as children of the family, and no one thinks of leaving home without

them. In every house can be found parrots in great numbers and of many kinds. A great many of them are never confined at all, particularly among the lower classes, where a small perch is stuck into the side of the street door, and on this polly makes his home. They never seem to fly away, even in the smaller villages, but to take to the more exciting and convivial life of the town. On the steamer coming down from Manáos, there were, among other things, two small jaguars, two tiger cats, monkeys galore, and birds, from the tiny paraquet to the enormous hyacinthine macaw, with its bill that breaks nuts, which are exceedingly difficult for a man to manage with a heavy hammer. There were also several snakes and chameleons, and one all-yellow parrot.

Another famous street of Pará is the "Palm Avenue," or Estrada de São Jose. This street is bordered on both sides by rows of enormously tall royal palms, and makes one of the most beautiful sights imaginable. But unfortunately, a few years ago the city authorities took it into their heads that the street ought to be paved with stones, and in paving the blocks were laid so near to the trees that their roots were cut, and in a short time this most imposing of streets will be no more.

The climate of Pará, although enervating, is less so than that of places farther up the Amazon, beyond the reach of the sea breezes. The thermometer has never been known to rise above 95° Fahrenheit nor to fall below 73°. The heat would not be oppressive but for the humidity of the atmosphere, which is such that one can never have dry clothes. Shoes left at night are mildewed in the morning, and as for starch or stiffness in one's linen, that is unknown. But even so, one is wakened at

about three in the morning by the comparative cold (say 75° or 76°) and is glad enough to get under a blanket. In the afternoon, at about four o'clock, comes the daily shower, lasting half an hour or less, and immediately followed by the sea breeze, which cools the air most deliciously. It is a curious thing that sunstroke is unknown in South America, while in India and the East Indies great precautions and care are necessary to guard against it.

Yellow fever is present for the most part of the year, but is never so severe as further to the south or to the north. It is curious what a bugbear it has become, whereas it is not contagious, and when well treated is not particularly dangerous. It kills more people by fright than in any other way. One never hears of the small-pox or leprosy, and yet the former is more prevalent than yellow fever. About the first of July, 1888, there were anywhere from fifty to seventy deaths a week at Pará from small-pox, yet no one thought anything about it, but if it had been yellow fever ships would have been quarantined. Any morning at that time when going into town one could see the small-pox patients sitting outside of the hospital doors, and on the edge of the town see them outside of their own huts wrapped up in a blanket or two. Later in July and August the small-pox rose almost to an epidemic, and another disease, which was at first mistaken for cholera, also came down the river from Peru. Several miles out of town is the lepers' hospital, containing a hundred or more patients. Having seen a great deal of this disease in other parts of the world, I did not visit the hospital. Beri-beri, a disease that causes the legs to become rigid and incapable of move-

ment, also obtains in all the tropical parts of Brazil. It is supposed to have been introduced from India, and is never seen outside the tropics. Change is about the only cure. Removal to a different room in the same house has been known to effect a cure, but more often a change of residence to another part of the town or to some other part of the country, and sometimes even a sea voyage beyond the tropics is necessary. Taking the climate of the Amazon region as a whole, it is considered by Orton more healthful than that of the Mississippi.

By the act of the 13th of May, 1888, slavery was abolished throughout the Empire. Slave-holders were not given any compensation. Some of the northern provinces, as Ceará and Amazonas, had already abolished slavery after having sold most of their slaves to the coffee planters in São Paulo. It was an act of necessity on the part of the owners, because of their inability to get a sufficient number of slaves since the suppression of the trade and also since the law of 1871, making all the children of slaves, born after the passage of the act, free. Free laborers and immigrants, moreover, would not work with the slaves. In 1887 the number of slaves in the Empire was 723,419, which must be taken as very correct, because no one who was not so registered could be held as a slave. The result of the act of the 13th of May has been an immense increase in immigration. In 1887 the immigrants numbered 54,990, and in 1888 over 130,000 arrived at the two points of Rio and Santos and the number for 1889 already promises to greatly exceed this. Italians form by far the largest body of immigrants into South American countries, to the wants of which they

seem to be better suited than perhaps any other nationality.

The population of Pará in 1883—the latest official statistics—was 40,000. Now it is in the neighborhood of 45,000, though some enthusiastic boomers have put it up to as high as 95,000. It is hard to get at the real figures, as the official population is only estimated. The pure whites are in the minority and negro and Indian blood, in all degrees of mixture, is seen on every hand.

There are several lines running boats on the Amazons, some going as far as Peru, and having branches going up the different tributaries. Of the river lines (in contra-distinction to those coming from Europe) the Amazon Steam Navigation Co., an English company flying the Brazilian flag, and receiving a subsidy from the general government, for which it makes two voyages monthly between Pará and Manáos, and also a subsidy from the provincial government of Amazonas for a third voyage, is the largest and best. It also receives a further subsidy from the general government for a monthly service between Manáos and Iquitos in Peru. This same company also has steamers running on the Rio Madeira to the Falls of San Antonio, a distance of 1,246 miles from Manáos; on the Rio Negro to Santa Isabel, 846 miles; on the Rio Purús to the cataract of Hyutanahan, 1,685 miles; on the Rio Juruá to Lake Marary.

By the *Compagnie de Navigation Brésilienne de Manáos*, subsidized by the Province, a steamer once a month from Manáos to the Acre, a tributary of the Purús, and up the Rio Javary, whole distance about 3,000 miles.

By the Compagnie de Navigation à vapeur de Manáos, which is under contract to the Province to make six trips a year to the rivers Purús and Acre with right to go on the Rio Ituxy; four trips a year on the Rio Juruá up to the Javancá; two trips a year on the Rio Jutahy; two trips a year on the Rio Javary.

Besides all these there are the Pará and Amazonas Company on the Lower Amazon and lines on the Tocantins, Xingú (pronounced, *shingú*) Tapajós and others.

Four lines from Europe also come up to Manáos and one of them has just commenced to run to Iquitos. These four are the Red Cross line, English, from Liverpool, stopping at Havre and Lisbon, making the voyage about once a month and subsidized by the Province which in return gets one 1st class and 15 3d class passages free; the Booth line, English, from Liverpool and New York and now running steamers to Iquitos, distant 2,500 miles, about, from Pará and also in receipt of a subsidy; the Compagnie des Chargeurs Réunis, French, from Havre, subsidized on same conditions as the Red Cross line, and giving further, a reduction of 30 per cent. on the price of passage to immigrants intending to settle in the Province of Amazonas. All these sea-going steamers are of very fair size, some being as large as 3,000 tons.

The fleet of the Amazon company consists of upwards of twenty-five steamers, almost all of them being English built, iron boats varying from 300 tons to 1,100 tons. Of these two only are screw, the rest being paddle boats.

The cabins are very narrow and are arranged to hold

four persons. Mattresses and pillows are furnished and also a wash basin. Water and towels are supplied on request as a great favor, with a man to see that they are not injured by too much rubbing. They are not considered as necessities by the ordinary traveller on the river. The passenger capacity of these vessels is not limited by the number of berths or staterooms, which are seldom or never used except by the few foreign travellers to dress in, but by the limit of hanging room for hammocks. Everybody of necessity must have a hammock, as the staterooms are unbearable at night. Even in the hotels they are more used than the beds. Some of the hammocks are very fine; those made of maqueira grass with feather lace trimmings are considered the best. It takes from several months to a year or more to make really good ones and they bring anywhere from a hundred to five hundred dollars a piece. The feather work is most artistic and very cleverly put together. The feathers themselves are all of their natural colors and are taken from the most brilliantly colored birds that are to be found. The Indians of the Rio Branco region, on the upper Rio Negro, have a great reputation for this kind of work. These hammocks will last a lifetime, though in use every day and washed once a month. The most common kind are of German manufacture, made of cotton, and imported and sold very cheap. These, however, are very warm and keep out cool drafts of air. The best cotton ones are of native grown cotton and made in Maranhão. The grass hammocks are much cooler than any bed as they let the fresh night breezes come through their loosely woven meshes.

Coming back to the steamers, one may say that the

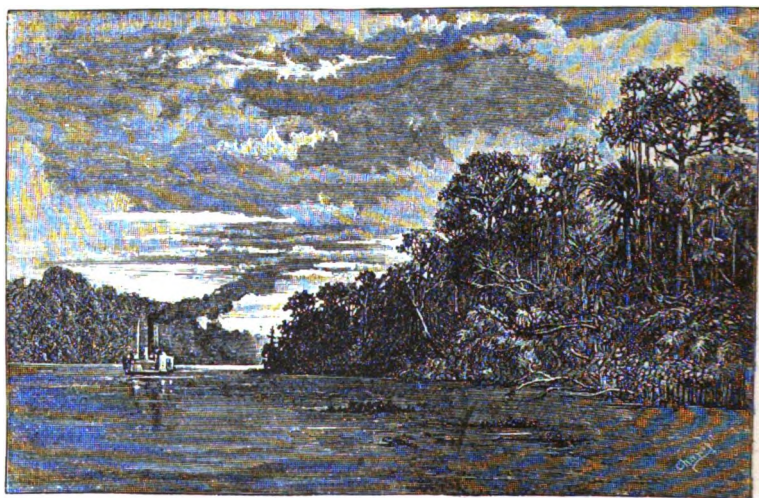
upper deck (the only deck first-class passengers have anything to do with), is kept beautifully clean, being scrubbed every morning with sand and bricks. The food is something frightful, and everything being put on the table at once, by the time people are seated some of the dishes have been waiting ten or fifteen minutes, and consequently are cold, and if they happen to contain gravy, so much the worse, for it is all congealed. Meals are served as follows: coffee and biscuit between six and seven in the morning, breakfast at half past ten, dinner at four in the afternoon, and coffee and tea at eight in the evening, with biscuits of various kinds. Table manners on the Amazon have not reached the desired point, since one's neighbor seeing a tidbit on one's plate thinks nothing of reaching over with his fork and transferring it to his own.

The crew are mostly Indians or half-breeds, and do their work very well. The captain, or commandante as he is called, has nothing to do except to cry out, "Larga, larga," coming into port and leaving it; in the first instance meaning to let go the anchor, in the second to let go some hawser or line to the shore. The pilots are the principal personages on board, and very clever they are, too. They take the boat through all the intricate passages on the darkest of nights, so dark that ten feet away from the bow of the boat nothing can be seen; and this when not all the channels are known to them, new ones being discovered every little while. On board the *Imperatriz Theresa* we had two, one an old Portuguese sailor, the other a young Indian, half white, of eighteen or nineteen years of age. He was a wonderful little fellow in his way, knew the river

as far as Tabatinga, the Peruvian boundary, over 2,000 miles, and would take the boat through the most intricate channels when it was so dark that a person was indistinguishable a yard off. He spoke a little English, having been a year at school in Philadelphia in 1883.

We left Pará at nine o'clock Sunday morning for Manáos. On leaving the wharves of Pará the boat crosses the stream in front of the town and rounding the point of an island enters the main stream of the Pará River. The boat remains too far out in the stream for one to get much of an idea of its banks, beyond a seemingly limitless expanse of palms and forest. The palms are more numerous on the lower part of the river near the sea than they are four or five hundred miles up. They always lend a pleasing and inviting look to the forest which no other tree seems to produce. Here they seem to grow in groves, while further along they are more apt to be isolated or to grow in clusters of different species. One may get some idea of their variety when it is remembered that they are more numerous here than in any part of the globe, the species found in the Amazon region numbering upwards of five hundred. The thickness of vegetation must be seen to be appreciated; it cannot be described, so tangled and snarled is it with undergrowth, vines, *cipos* and the like. Now and then one sees a hut made of thatched palm leaves with numerous brown and naked little children rolling on the ground or playing in canoes. There seem to be more women than men, though a great many of the latter are in the forest after rubber, or off fishing in some quiet creek. The first stop was at Breves, where we arrived at three o'clock in the morning. The town was all

asleep, and nothing much could be seen from the boat. From Breves commences the beautiful part of the river, which extends as far as Santarem (pronounced Santarém). The boat goes through narrow, winding channels, the branches on both sides brushing against the paddle boxes. In the cool of the early morning, before the sun has barely risen over the top of encircling forest, it seems as if fairy-land had been reached at last.



Breves Channel.

Every leaf is wet from the heavy dews or shower of the night, and the most brilliantly colored birds fly back and forth, all glistening in the sunlight. The sporting passenger can amuse himself shooting at ciganas, with their beautiful iridescent bronze coating, or white ibises, which appear roosting on every floating log. The ciganas are a sort of stinking pheasant, and as may be supposed from their name, are not good eating. This scenery lasts all day, in fact, it may last for days if one

does not follow the main stream. Of course at the end of the dry season a great many of these channels are too shallow to be used.

In the evening we reached the small village of Gurupá, and stopped just long enough to leave and collect the mails. When we left there it was quite dark and about an hour afterward we entered the Amazon proper. Nothing of the banks could be made out, of course, except that the channels were a little larger. Some idea of the size of the Amazon may be gained from knowledge of the fact, that there are about 25,000 miles of navigable waters for ocean-going steamers, and over 45,000 miles for light-draft river boats. Sailing ships have been, and can go to Iquitos, in Peru, a distance of 2,500 miles from Pará.

Early the next morning we were at Porto de Mos, a village on the Xingú. The houses were mostly very tumble-down affairs, though one of more prosperous appearance than the rest was built of glazed tiles, and, with its wood floor and few cane chairs, looked very luxurious in comparison with the rest with their filthy mud floors. The two churches of the town appeared much neglected, quite good sized plants growing out of the crevices between the stones in the wall. Perhaps they gave it rather a better effect than otherwise, as the architectural beauty of the building was not great. The bells were hung to a cross beam resting on two upright poles placed just outside the main entrance. The churches, generally, on the Amazons, are very much out of repair and religion is rather at a discount save for fête days which give an excuse for all hands to get drunk on the frightful-tasting but otherwise harmless

and healthful *cachaça*, a rum made from the sugar cane. The priests are, perhaps, the most immoral of the whole population. There are some exceptions, of course. I met one who was said to have forty-two children whom he acknowledged. Some allowance may be made for him, however, when it is taken into consideration that he was three-quarters negro and had never been even as far as Pará.

Every little village, no matter how small, has its billiard hall, and they are always pretty well filled. It is the most popular game on the Amazon. The tables are not the best, and mostly come from France. The game is played with some odd, complicated methods of scoring peculiar to Brazil.

One of the inhabitants of Porto de Mos had as pets a pair of birds, the size of young turkeys, called Jacamim. They were very tame, as is usual with Brazilian pets, and allowed themselves to be handled by any one. Their heads, necks and under parts of their bodies look and feel like black silk plush. The backs and wings are covered with greenish-brown feathers, very fine, hair-like almost, similar to the feathers of some birds of Paradise. They make a curious groaning noise if disturbed.

In all of these river towns is stationed a guard of municipal police. The uniforms are similar to those of the army, excepting the cap, and the men are armed with sword or rifle.

Any one who can scrape together a dollar or two can get a gun. But such guns! Made of tin or old scrap iron, put together in the flimsiest way imaginable. It is a wonder that there are any inhabitants left at all.

The Xingú is a black water river, and in leaving Porto de Mos we crossed the line from that into the yellow waters of the Amazon. The line is very distinct, so distinct indeed, that one could lay a pencil down and on one side would be black water and the other yellow, or "white" water, as it is called. The waters of the Tapajós are also black, but it and the Xingú differ from the black water of the Rio Negro. The former is a brilliant blue-black, while that of the latter is more of a dark bronze.

At some little distance from Porto de Mos the forest is neither so high nor so dense as below, and at intervals come open spaces called *campos*. These have horses, sheep and cattle on them, and give quite a pleasant variety to the scenery. The palms begin to get less numerous also, the farther we leave the sea behind. Over some of these *campos*, far to the north, can be seen a low cluster of hills. These are on the northern bank of the river and are the first high land seen in going up the stream.

A short stop was made at Prainha at 2 o'clock the next morning for the mails. It seems a pity that so many stops should be made in the night time, but as the year's quota of travellers can be counted on one hand, it would not pay to consult their wishes only.

After breakfast we saw Monte Alegre in the distance, nestled on the hillside. It looked very attractive with its red tile roofs and the church, which stood out quite plainly, but that "distance lends enchantment to the view" is especially true of Brazilian towns.

The first alligators were seen this morning, but they do not begin to be plentiful until above Santarem. This,

however, is not the proper season for them, as the waters are too high, and there are very few beaches left for them to bask on, while a great many are hibernating.

For the first time we were troubled with mosquitoes, but luckily a breeze came which drove them away. However, they are not a circumstance to some of the other insects, as *piums* or *mucuims*. These leave frightfully itching bites that last for five or six months, and in case of *mucuum* bites, the flesh swells and becomes like putty, and by pressure of the fingers, dents are made in it that last half an hour or so.

Among the freight on board were a lot of American rocking chairs and Singer sewing machines, going away up river beyond Manáos. Both these articles are in great demand, and one finds them in most unexpected places.

We arrived at Santarem at eight in the evening, and everything was closed save one or two billiard halls. The town had a very pretty effect in the moonlight with its sand beach. The scenery for some distance below the town is simply enchanting. The country is a trifle more open, and the trees are fairly covered and festooned with ivy-like vines, giving a marvellous soft effect. Lagoons were quite frequent, too, and were covered with flocks of white ibis and blue herons.

The houses of Santarem are very well built; the streets are clean and are lighted with kerosene lamps. The town has quite a trade in rubber and drugs, brought down from the headwaters of the Tapajós and transhipped to Pará or Europe direct. It is just back of here that the American colony settled just after the war. On the whole it has not been a success, and only about twenty remain, and of these but three or four are accom-

plishing anything at all. The rest are anchored here, as it were, from their inability to get away. The land is fertile enough, but labor is high and difficult to get, and slaves could not be made to work, as they would run away to the forest, lose themselves, and never be seen again. The slaves in these northern provinces, practically, did as much work or as little as they liked.

The town of Alemquer was passed during the night, and in the morning we were in the cacáo region. We went along the whole day within fifteen or twenty feet of the bank, and past "sitio" after "sitio" of cacao. This country was the most thickly populated of any we saw. The houses, quite substantial affairs, made of heavy logs and plastered with mud, generally have a garden in front, containing a few brilliantly colored plants and flowers, with a few cocoa-palms and a banana patch. They seem to be overrun with children of all ages and colors. Birds of all kinds seem to become more plentiful also. Castor-oil trees by the thousand, monguba trees and the beautiful mangeiras trees are also common. In 1863 a traveller by the name of Gustave Walles discovered on the Rio Branco, a monguba tree, the trunk of which rose one hundred and fifty feet to the first branch, while the circumference of its crown was 815 feet, and it cast a shadow of 5,416 square yards. It is estimated that 10,000 men could camp under it.

In the afternoon we reached Obidos, and for the first time saw both banks at the same time. The river is only a mile wide, and its immense volume of water rushes past at the rate of six miles an hour. Bottom has not yet been reached in the channel by the soundings that have been taken. The town is situated on a

steep bluff, and half way down is an old stone fort, containing a few superannuated guns, of no earthly use, and manned by half-a-dozen soldiers or so. It being the "festa" of Bom Jesus, flags were flying, the church was newly painted and a stand had been erected in the square, where they were to have music and fireworks to last three days. Nothing can ever be done in Brazil without fireworks. The band was practising and every one seemed to be playing a composition of his own.

On the highest piece of land in the town, a situation commanding a most magnificent view up and down the river, stood a large one-and-a-half story house, sixty feet wide by about one hundred deep, with a very large garden behind it, the whole for rent at thirty milreis (fifteen dollars) a month. It was very well built, had been vacant for a long time and there was no prospect of renting it.

One of our passengers lived here and he invited us to see his house and shop. Both were in the same building. He sold mostly dry goods and notions of all kinds. The living part was a very poor affair, but above the average Brazilian house. The garden behind it was the best part of it, and he seemed to think so, too. It contained roses, jasmines, bananas and a few grape-vines, which he said were imported from America. Nailed up on one side of the door was a large skin of an ant-bear which his son, a lad of thirteen years, had killed a few days before.

We took some horses and cattle on board here for the upper river. The horses had a broad leather belly-band put under them and then were swum out to the

ship and hoisted on board by the donkey engine. It was a much simpler affair with the cattle, which were swum out with merely a grummet around their horns, by which they were hoisted on deck. They all seemed to take it very coolly. The cattle seemed to know exactly when they could stand on their feet again, but the horses had to be let down till they touched the deck, with their legs all limp, when immediately there was a great scrambling to find their feet. They were about the size of a large polo pony, and though not handsome looked wiry and tough. The cattle were of medium size only.

Early the next morning we came to anchor off the cacao sitio "Amisade." The proprietor was a large, strong, jolly Portuguese, who looked as if he did not know what liver meant. After having carefully sent all his women out of sight he asked us ashore to look over his plantation. The house was like all the sitio houses. In the shop, by means of which he kept all his laborers in a state of perpetual peonage, were all those articles necessary to a country where there are not shops, sometimes for more than a day's journey, knives, calicoes, every sort of thing to attract the eye of the ignorant Indians.

The cacao is a large shrub, its stem often growing as large as seven or eight inches diameter. When a plantation is first started it is planted from the seed and lasts for thirty or forty years, new shoots springing from the stumps of the old ones as they die and decay. The fruit is yellow, in shape something like a cucumber or bobbin, and it grows directly from the main stem. In the centre of it are the beans

in a row, covered with a thick white substance, which is sweet but insipid. A wine is made of this which is very popular in the cacao regions. The beans are dried and packed in a way that brings less money than if more care and trouble were taken. But the people are too lazy to work more for an increased profit, when the profits are large in any case and the conditions of life so easy. This man expects to retire to Portugal soon on a comfortable fortune, after a residence of less than fifteen years on the plantation. The rind of the cacao fruit is burned and from the ashes they make a most excellent soap, called *sabão de cacdo*, which is good, especially for taking out stains, and it is said is the only thing that will take out iron rust without injury to the cloth. Nearly all the cacao of this region, which is considered finer than that grown anywhere else, is sent to France. All the poorer grades and that grown near Bahia come to the United States. Why this is so I have been unable to find out.

If one asks any of the women on these rivers who are the fathers of their children, they give the same answer as twenty-five years ago they gave to Mrs. Agassiz, "They are the children of chance, senhor." The immorality of these North Brazilians is simply beyond conception. A Brazilian will introduce his children as legitimate and illegitimate, as the case may be, and they all live together. If a person dies who is legitimate, be sure it is put on his tombstone, whereas, if otherwise, nothing is said about it. The mixture of races is probably one of the causes of all this. In one family often may be seen children varying from black to white and some of them showing traces of Indian blood. In nine

cases out of ten the children are weaker than their parents in every way.

On leaving the sitio we took in tow a small *montaria*. Evidently we ran into a school of fish, for numbers of them frightened by our passage through the water began jumping out of the water to a height of four or five feet, and in fifteen minutes enough had fallen into the *montaria* to be served for luncheon to all the ship's company. A pair of fresh water dolphins began disporting themselves in the water, exactly like their relatives of the sea. This is the only kind, and this the only place, where these fish are found.

The next stop was Serpa, or as it is now called Itacoatiara, meaning painted rock. This small town has gone through various vicissitudes, as moving from one side of the river to the other several times and changing its name to Serpa and Itacoatiara, back and forth, three or four times. It has a large trade in castanha nuts, or as we know them Brazil-nuts. In going down the river we took on over sixty tons of them at one shipment.

An American has a fazenda here. Tradition has it that he first came out thirty years ago as a Methodist missionary, then became a trader, and finally settled here. There are about four hundred acres cleared, all told. Though the meadows look in no wise different from our best farming land, he said that it cost him about fifteen hundred dollars a year to keep them clear, and if he neglected them for a month, it would take two or three months to get them into condition again, so fast does vegetation spring up in this region. Cattle and tobacco are his principal productions. The former are of very good size, averaging, say, one thousand pounds, and their

meat was good. He sells most of them to the river steamers, as, although he has the only cattle in the town, there is no call for meat, except very occasionally when enough people club together and buy a whole steer. The tobacco is one of the strongest in the world, and sells quite well in Pará among the poorer classes, but it has not the delicate flavor of the Pará product, which is probably the best cigarette tobacco in the world, though the South Brazilians prefer that of the Rio Novo.

One morning we were apprised of our near approach to Manáos by meeting more steamboats than we had seen altogether before, some bearing such familiar names as Mississippi and Ohio. Rounding a bend of the river we saw a broad expanse of black water stretching away to the horizon on the right. It was the Rio Negro. Seven miles from its mouth lies Manáos. Having dropped anchor in front of the town, we were visited by the board of health and the custom officials, for each province has its own custom-house and levies duties on all articles passing through it even, unless destined for a foreign port. They did not interfere with us at all, however, as soon as they found out we were only travellers bent on seeing the country. Manáos is rather well situated on high ground, rising gently from the river. There is a very fine view of the river and some islands lying four or five miles out that can only be seen during a rain storm. The town has about 15,000 inhabitants, and is quite a thriving place. It is very centrally placed, being at or near the junction of the three rivers Rio Negro, Rio Madeira, and the Solimões or upper Amazons. Rubber, of course, is its principal item of export, but it levies tribute on cinchona bark from Peru, which is here transhipped to Eu-

ropean steamers. It is feared that since one line from Europe has commenced running to Iquitos, others will follow suit and ruin the trade of Manáos. It would still have the trade of the Madeira and Rio Negro to fall back on, however, and if the railroad is ever built around the Falls of San Antonio, it would more than make up the loss.

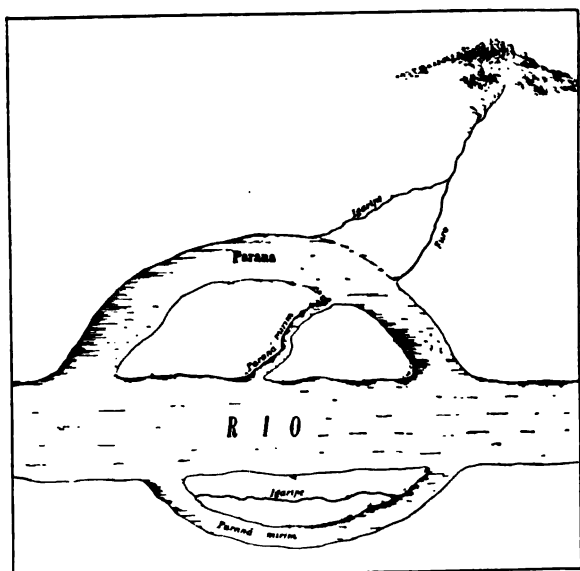
The cathedral is the most prominent building seen from the river. It was contracted that it should be of white marble, but it seems that there are "boodle" provincial deputies in Brazil as well as at home, for it is nothing but brick, and a good deal of it sun-dried at that, stuccoed over. The contractors are supposed to have cleared \$200,000 on the transaction from the Province. It seems to be the general rule with foreign business houses in Brazil as soon as a man goes into politics to take his name off the books and have no more to do with him in a business way, as they say that once in politics, one can depend on them no longer.

There are here a school for education of Indians, a normal school, a seminary, fifteen public primary schools, and many others of various grades. Not half of them are used, but serve the purpose of keeping numbers of young Brazilians from working, who think it degrading to do any sort of work except in some government position where often the only work is to draw their salary when they can. As one would suppose, education is very backward and the few that can read and write know hardly much more. The children are taught in the oriental method, *i.e.*, the whole school shouting out their lessons all together, the words, not their meaning, being dinned into their heads by ceaseless repetition.

Manáos is also a naval station for gunboats on the upper Amazon. The boats are mostly small, shallow, wooden steamers, of not great speed, but still quite sufficient to overcome their only likely foes, the Indians. One of them was designed and built here, and when finished was found to have been turned end for end, so they fixed a rudder on what should have been the bow, and so she stands to this day. The discipline is best shown by the complete absence of it. Although the officers spend six years in a naval school, it is no uncommon thing for them to get lost out of sight of land. In fact, three several times, men-of-war carrying prisoners to Fernando Noronha, have returned to Pernambuco, reporting that the islands must have disappeared as they could not find them. The ironclads, splendid ships most of them, rarely or never leave the harbor of Rio, and one had lain there so long that one day she was reported sinking, and upon examination it was found that her plates had been eaten through by the action of the salt water.

In reading books on the Amazon, one is often puzzled by names of various pieces of water spoken of, as, "furo, paraná, paraná-mirim," etc. These are not proper names, but generic names of different kinds of streams as shown in the plan prepared from data furnished by the Commandante Rufino Tavares and the two pilots of the steamer *Imperatriz Theresa*.

The word "rio" corresponds to our word river exactly. "Paraná" means a channel of a river, encircling a piece of country more or less large, and its waters, those of the river, increased perhaps, by streams falling into it, but having no proper source of their own. "Mirim, or Miri," as it is sometimes spelled and called, means little,



and consequently, "Paraná-Mirim," is simply a small paraná. A "furo" is a creek, or brook, or small river having a source of its own. An "igaripé," meaning literally a "canoe path," is a small stream of water having no source, but connecting any of the above with each other, and sometimes is like a "paraná-mirim," save that it is much smaller. Another thing that sometimes confuses one is a town having two names, as can be seen on any map of Brazil. Santa Maria do Belem is the right name, but it is called Pará, because it is in the province of Grão Pará. Pernambuco the same way. Its right name is Recife. São Salvador is called Bahia from its province. The money in use in the Amazon regions is paper treasury notes and nickel coins. In the south of Brazil silver is more common, but gold is at a premium. Up the river one is often asked to ex-

change certain bills for others of the same value, for it seems that every little while the treasury calls in certain issues, and any note of these presented after a certain date suffers a discount of ten per cent. and ten per cent. additional for each and every month afterwards till only ten per cent. of its face value is paid on presentation, and there it remains. In the far interior it is difficult to use paper money at all, as communication is so slow that sometimes the money is absolutely valueless before notice of its recall is received. The bills, by the way, as well as the stamps, are all manufactured in New York.

The following table may be useful :

A Table of Distances of Towns and Villages on the River Amazon between Pará and Mandos on the Rio Negro. Computed from a table used by the Commandante Rufino Tavares, of the Amazon Steam Navigation Company's Ship "Imperatriz Theresa."

Belem or Pará.

146	Breves.									
269	123	Turupá.								
317	171	48	Porto de Mos.							
413	267	144	96	PRAINHA.						
456	310	187	139	43	Monte Alegre.					
515	369	246	198	102	59	Santarem.				
552	406	283	235	139	96	37	Alemquer.			
612	466	343	295	199	156	97	60	Obidos.		
707	561	438	390	294	251	192	155	95	Parintins.	
844	698	375	527	431	388	329	292	232	137	Itacoatiara.*
954	808	685	637	541	498	439	402	342	247	110 Manáos.

Brazil, as a whole, is a country of limitless resources,

* Formerly called Serpa.

and the southern part is sure to grow in every way, but the Amazon, from its climate, and from the difficulty of conquering vegetation, will certainly be one of the last places in the world to fill up with colonists from the Old World, and if, as seems likely, a republic be declared after the death of the present emperor, this will be put off still longer, as from the great antagonism of North and South Brazilians, civil war is sure to follow.

THE SOUTH AFRICAN REPUBLICS.

BY

MISS A. RUSSELL.

The Boers who people the Republics of South Africa which lie north of the British Colonies of the Cape of Good Hope and Natal, between the Orange and Zambesi rivers, are descended from the early Dutch colonists, and French Huguenots, who made the first civilized settlement at the Cape of Good Hope in the middle of the seventeenth century.

The value of the Cape of Good Hope as a key to the East made itself apparent to all the nations who traded with that quarter, and England developed a great desire to possess it. After various indirect ways of trying to attain that end, the British Government added it to their dominion in 1806 by conquest. The early history of the English administration here is one long story of misrule and incapacity, and in relation to the Dutch settlers a purely despotic establishment which at length drove them to desperation, and bred in them a determined and fanatical desire to escape from it. This led them to abandon the Cape Colony in large numbers during the years 1835 and 1836. They *trekked* northward and formed a republic in what is now known as the British Colony of Natal, and later on the republics which lie northward to the Limpopo River below the 22d degree of South latitude. The British Government raised no opposition to these migrations of

the Boers, but permitted them to lay the foundations of civilized states in these wild regions and establish their own republican form of government, and then rudely fell upon them, dispossessing them and repudiating their claim to independence.

This is the history of the relations which existed between the English and Boers for over half a century in South Africa, until at length the English Government seemed to awake to the fact that this continual aggressiveness levelled at the poverty-stricken and down-trodden Boers was a profitless persecution, inducing neither peace nor prosperity to any condition, and pointing to no ultimate conciliatory relations, and, in 1852, granted a charter of independence, which freed them from the allegiance it could not compel them to acknowledge. As the result of this act, the Boers found themselves in undisputed sway from the Drakenberg Mountains on the south to the illimitable stretches of country which lie north of the Limpopo and on to the Zambesi River. In the years which ensued they realized a "Promised Land," a genial soil which produced in lavishness for a minimum of effort, and their flocks and herds increased and multiplied past computation. Within recent years these republics have developed mineral wealth which renders them one vast field for enterprise, exploration and capital, and the attitude of the English Government has at different times given rise to complications which, but for the spirit of the Boers, would have made them once more subjects of the great empire, on whose dominions it is boasted the sun never sets.

The sympathies of American people should be drawn towards these South African Republics, whose history is

in some points not unlike their own, and my hope is that through the streams of commerce which must ultimately flow between these kindred countries, a knowledge will be gained in this country of the South African republics which will forever set the Boers at rest on the score of the safety of their independence. As the advance of interknowledge grows between nations so will the spirit of the strong to dominate the weak lessen in power, and a higher ambition replace it ; the ambition to compass the interests of mankind in perfect mutual relations, which is the only secure, as it is the highest type of bond between nations.

The history of the Boers and the struggles which they have waged with the English for independence, bring us to contemplate the work which their pioneering enterprise has accomplished in South Africa, opening it to civilization, which is gradually pushing its way to the very central regions of the continent.

A period of twenty years has elapsed since the first discovery of diamonds took place in West Griqualand, a province of the Orange Free State. During all that period the production of diamonds has given yearly a steady average, and recent statistics compute the total value in bulk to amount to £45,000,000. Within later years the production shows an increase, and the mines average an annual output that rather exceeds than otherwise £4,000,000 sterling.

The good old days have departed when each man had an allotment and mined for his own special behoof, while his wife or sisters took their share in the work by sorting, which was an employment to which they were admirably adapted, from the fact that it required more keenness and

mother wit than mere physical labor implies. Individual mining has been gradually pushed out of the competition, the claims by degrees drifting into the hands of companies, and the immense industry which diamond mining now forms in South Africa is directly controlled by one or two syndicates, and in these the Rothschilds hold magnificent interests. The camp of other years has made way for the pretentious architecture which wealth demands as representative of its power, and Kimberley, the capital of the diamond fields, is now a handsome city with a population of 20,000 souls. It is lighted by electricity, and tram cars intersect its streets, and generally its aspect is not widely different from that of a wealthy section of London.

Railway communication with the Cape of Good Hope, a distance of 647 miles, and a plentiful water supply from the Vaal River have greatly added to the comfort and cheapness of living there. The recent developments have quite changed the aspect of mining, the barriers which formerly divided the individual allotments have disappeared, and these have gradually merged until they form single mines of immense extent, the appearance of which is that of huge pits. The Kimberley mine would cover a space of eleven acres of ground. Looking at these pits from a distance, the intersection of ropes and chains which encompasses them throughout finds an apt illustration in a spider's web. By means of this complicated network the miners descend and buckets are worked backwards and forwards conveying the diamondiferous soil to the surface. The mines are worked to a depth of 500 feet, and from these extensions tunnelling is carried on in the same way as at coal mines, stretching under-

ground to a depth of 100 feet. The soil in which the diamonds are found is a blue clayey composition, and it exists frequently in the neighborhood of huge rocky boulders. The soil is taken from the mines, and at the surface tram cars convey it to open ground some distance away, and here hundreds of thousands of tons of it are spread out to dry, after which it is returned to the mines and washed.

The scientific theory with regard to the occurrence of diamonds in this flat and arid region is that in past ages of the world's unrecorded history there must have been an eruption far down in the depths of the earth, which threw up vast streams of boiling liquid mud from the craters below, and this ultimately resolved the carbon into the crystallized form which emphasizes the diamond. As a matter of fact this rests on no higher basis than supposition, and probably on that foundation also it is asserted that another half century will not see these mines exhausted, therefore the wealth which they represent is past the power of computation.

The spirit of rapacity which has characterized the action of the English Government in their dealings with South Africa led them to assert claims to the diamond fields. The justice of these claims has never been admitted, but their power to enforce them enabled them to secure possession, and this region is now a part of the British dominion. The extension of the diamond mining area in recent years has opened up some valuable mines in the Orange Free State territory, and on the banks of the Vaal River, a boundary which divides it from the Transvaal.

There are in existence old Portuguese maps of South

Africa dating back to the 16th century, in which the locality now known as the Kimberley diamond mines is indicated thus: Here be diamonds! Just as accurately have these old Portuguese geographers indicated the gold bearing regions of South Eastern Africa, which are regarded as the discoveries of modern enterprise, and the fact is apparent that Portuguese exploration in Africa was of a much wider character than is generally known, and must to a great extent have guided the work of modern explorers.

For the past two centuries gold has been obtained from the natives on the East Coast in barter for the wares of civilization which they have learned to know a need of. Sofala and the countries which lie beyond are on the authority of trustworthy writers assumed to be the Ophir of the Bible, the region over which the Queen of Sheba wielded her sceptre, and from whence Solomon obtained the supplies of gold which added significantly to the splendor of his reign. The testimony of the old Portuguese writers is all in favor of this evidence, and added to this Josephus and the Koran can be quoted in support of it. In brief, the Portuguese writers compass these facts, that books exist among the inhabitants of this country which prove that Solomon obtained his gold here, that these mines bear traces of having been worked from the earliest ages; at the period of the Portuguese conquest here they were open and working, and the reason of their abandonment of them is not clearly ascertained, but it is surmised that the discovery of the New World influenced it.

In modern times no two men have contributed more valuable geographical and scientific information on the

score of these shadowy regions than Thomas Baines and Carl Mauch, two intrepid travellers and dauntless explorers whose names are familiar to all South Africans. They penetrated into these unknown regions and gave them a definite place in geography, where before they had merely been characterized as imaginary deserts or jungles sacred to the habitation of the lion and the elephant. The scientific observations which these men made have led up to the extensive gold discoveries in South Africa which are now astonishing the world and which in the immense areas of country over which they spread have revealed the old workings which exist, and the remains of ruins of ancient buildings and palaces that proclaim that an advanced state of civilization prevailed which is utterly foreign to the present inhabitants.

The Portuguese had, at the date to which I have alluded, penetrated very far into Central Africa, and the natives on the Congo and the East Coast retain traces of a civilizing influence, and in the degree to which they cultivate, and in the desire which they evince for commercial intercourse they are far in advance of the tribes further south. The natives from Central Africa bring down to the East Coast ports gold, silver, malachite, ivory, indigo, wax, sago, and arrowroot. These industries owe their inception to the early influence of the Portuguese.

The first discoveries of gold in South Africa were made in the northeastern part of the Transvaal, in the district of Lydenburg, and they were of the alluvial order. These fields were worked from 1883 to 1887, and from available statistics it is computed that the amount of gold shipped through the ports of Cape Colony and Natal made a to-

tal value of £680,000, but I may affirm on reliable data that this represents only a small proportion of what was actually found. Diggers betray a close reserve on the subject of their finds, as there is nothing they dread more than a rush on what they regard as their peculiar preserves, and many of them quitted the picturesque solitude of this Lydenburg valley, carrying quietly away the snug little fortune their labors had amassed. As an instance of the simplicity of the mining operations I may state that my sister established herself there; she made the first lady in the community, and lived for some years in a little canvas tent with a younger brother in the mountainous isolation. She possessed a claim, and personally supervised the labor of her natives. Her success was not immediate, but at different times she found gold in small quantities sufficient to pay her expenses and give her encouragement. At the end of two years her success was trumpeted forth from one end of South Africa to another, and she was accounted a great heroine in that some large and valuable nuggets were found in her claim; the largest of these weighed 5 lbs., and it was exhibited at your Centennial exhibition with several other nuggets from her claim and together with about 50 pounds weight of gold found by Mr. Cameron—the whole quantity was exhibited by him. At this time my sister had united her fortunes to his.

The success of these mining operations in the north-eastern part of the Transvaal attracted the notice of the British Government. At this time the republic under the administration of an able and enlightened president, Mr. Burgers, was prosecuting progressive schemes that necessarily were adverse to the interests of the British

Colonies. These Colonies had hitherto monopolized the trade of the interior republics, which is a rich and valuable one, the exports consisting of wool, ivory, feathers, gold and diamonds, besides agricultural produce. Mr. Burgers conceived the idea of a trade which would be independent of British ports, and he entered into a treaty with the Portuguese Government for the construction of a railway from their port on Delagoa Bay, on the East Coast, to the capital of the Transvaal. Delagoa Bay is the finest harbor in South Africa and the gateway to the richest part of that country.

The prospect of this railway communication met with great disfavor from the British Colonies, diverting as it would the trade which constituted their chief prosperity. Forces were set in play with a view to obstruction, and finally resulted in the annexation of the Transvaal by the British Government in 1877. The justification for depriving the Boers of the independence guaranteed them in the charter of 1852 was set forth in a list of flimsy pretexts which were without one jot or tittle of truth. The Boers, it was argued, could not govern themselves, their native policy endangered the British Colonies.

The Boer Government, which embodies the principles of republicanism, offered securities and privileges amply illustrated in the fact that a considerable number of British subjects had settled under it, and with regard to their government and dealing with the natives, as compared with other records, it is exemplary; the proof of this finds expression in the fact, that they, a handful of Boer settlers, have lived in a very network of the most powerful of the South African native tribes on terms of

peace for over half a century. As contrasted with this the English have waged a succession of bloody and devastating wars which have attached an aspect of terror and savagery to South Africa that has greatly retarded an extended colonization of its shores. To summarize briefly the events which preceded the annexation of the Transvaal I will quote a short passage from a work of my own, "The Alien Transvaal," which illustrates the argument I have sustained. This work has been favorably commented on by the English press, as recording impartially the occurrences of the time.

"When Mr. Burgers was made President in 1872 of the Transvaal he tried to preach to the Boers that their safety lay in their aiding the development of their country's resources, thus increasing their revenues and establishing a strong government which would be its own security against the intrusive interference of other nations. Rewards were offered by Government for the discovery of payable gold fields, and this led to the opening up of Pilgrims' Rest in 1873. It lies about sixty miles to the northeast of Lydenburg. The success of a few diggers had the effect of creating some excitement in this direction and in less than two years a flourishing little township numbering a population of four to eight hundred souls had grown up in the picturesque isolation of the mountains. Stores were established, law agents prospered, a bank, temporary places of worship, a newspaper, all found new pastures for their extended efforts.

"The population at the gold fields consisted altogether of English people, and to meet this difficulty the Government had generously nominated their magistrate and

officials from their own countrymen. They were also granted the privilege of electing two members to represent them in the Volksraad, and indeed they were little less than constituted an independent little English Colony in a Dutch republic; but the very freedom and independence granted them, made them, instead of contented, ambitious and unmanageable. They promulgated a strong advocacy for British rule, even going so far as to ask England to take them under its protecting ægis, and while the republic was plunged in the distractions of a Kafir war, which there is very little doubt was incited by the element which desired its ruin, they abused the confidence the Government had placed in them by defying all authority and assuming an open disregard for all law."

President Burgers found himself harassed and beset on all sides, his schemes for the progress of the country obstructed by this petty but expensive warfare, and a plotting spirit of mischief at work among the English community, on whose intelligence he had relied for support in his schemes for the advancement of the country. At this juncture the British Commissioner stepped in, fresh from Downing Street, with instructions to annex the country. The Boers were not in a position financially or otherwise to take action against this fresh foe, and President Burgers counselled them strongly against attempting an armed resistance; he advised them rather to wait the result of an appeal to England's justice and to organize a deputation to represent that appeal. Mr. Burgers retired to poverty and obscurity utterly broken down by the ruin which had overtaken him, and he died broken-hearted. The Boers had so much faith in

the counsel he gave them, that they sent three successive deputations to England; these in turn urgently protested against the British Government retaining possession of the country, and argued that the facts of the case as represented, no longer gave them a justifiable excuse for doing so.

In the meantime the people of the country adopted an attitude of passive resistance, they refused to pay any taxes or in any way to acknowledge the alien government. In this manner two years passed away, when a change came over the attitude of both parties, the Boers, convinced that mere appeal to England was useless, had determined to take up arms to vindicate their rights, the British Government were becoming dissatisfied that no profits were forthcoming from their new investment. They established a military despotism over the Boers, and when the first attempt was made to enforce the payment of taxes by sending troops to seize on personal property, the first shots were fired which opened the Boer war. The Boers proved themselves organized and brave, and the disciplined and picked troops of the British Government sustained defeat after defeat at their hands, until a very panic seized them in the face of the Boer marksmen, whose deadly aim never failed of effect; the English officers were picked off almost at one fell swoop, their distinctive dress making them conspicuous targets.

The bravery of the Boers and the success which attended their arms attracted considerable attention to their cause, and universal sympathy was expressed for them by the nations of Europe.

The final act in this cruel struggle came when the

English were driven from a strong position they had taken up on the Majuba mountain, the general commanding the forces slain and his officers all taken prisoners by the Boers.

Mr. Gladstone at this time, 1880-1881, was at the head of the English Government. He realized that the action of the Boers was no mere discontent set on foot by agitators, but a widespread and deep-rooted antagonism to England's rule. He magnanimously admitted that that rule had been established through the misrepresentation of English agents, and acting on these convictions, he lost no time in performing an act of tardy justice. Majuba was succeeded by the negotiation of peace proposals, which resulted in the Transvaal being restored by England to the Boers. Once more their muskets were laid by, and they fell back to their contented pastoral lives. The English have attributed many ignoble characteristics to the Boers. I cannot give you a better idea of them than by quoting their action at one or two critical periods, which I think often gives the test of nations as well as of individuals. In 1879, when the English Government were at war with the Zulus, it would have been easy for the Boers to have allied themselves with the Zulus or to have taken up arms independently and ousted the British from the Transvaal, but they took no unfair opportunities. During the Boer war there was not an act of spoliation committed or a home desecrated, though thousands of English were at the mercy of the Boers. Pretoria, the capital of the Transvaal, was entirely evacuated, the inhabitants having been ordered by the British administrator to take up their residence in the fort as a besieged

people. The Boers might have burned or pillaged the homes of these British residents, but not in one instance was an act of this nature committed. The moderation they exercised, the freedom from lawlessness and license, which marked their action from the extreme north to Lang's Nek finds in history no parallel. They sought no petty individual revenge, but insisted upon their rights in a spirit of greatness that is worthy of the highest admiration. Distinguishing between might and right, England's short-sighted policy in South Africa has lost her prestige, possession, and will drain from her a large proportion of a magnificent commerce of which she might have had the entire control.

A general depression succeeded the subsidence of these two wars, the Zulu, and the Boer, which followed rapidly one on the other. They brought a glut of money into the country which was recklessly squandered. The influence which these wars exercised was to divert men from industrial pursuits and to pander to the depraved desire to amass wealth through any speculation, however illegitimate. The withdrawal of this species of excitement turned the attention of men's minds to other resources, and once more the reputed mineral riches of the East absorbed attention. A spirit of active prospecting was carried on northward from the old diggings at Pilgrims' Rest, and the de Kaap valley, which lies in a network of mountains, many of which are volcanic in origin, was the centre to which attraction converged. The attention of prospectors was directed to the search for alluvial gold, and only due to the fact that this—occurring only in patchy deposits—gave a very uncertain outlook to the establish-

ment of any permanent working, was notice bestowed upon the prospect of securing better results from the quartz reefs, in which the indications of gold had been pronounced by Mauch and Baines to give promise of great richness.

An immense amount of laborious work resulted in practical experiments, but the outcome gave generally encouragement. The discovery of a literal mountain of quartz which proved of extraordinary richness and which has been named "Sheba," laid the foundations which are now turning South Africa into one vast field of mining enterprise. Several hundred-weights of the quartz from the Sheba mine were sent to Messrs. Matthey, Johnson & Co. of London, and as the results of assays to which they subjected it, it yielded variously 47 oz., 20 oz. and 13 oz. to the ton. A positive craze seized upon South Africans, and the populations of whole towns set out for El Dorado.

The production of gold from the Sheba mine gives a monthly record of £50,000. Its capital is £680,000. Two hundred companies were soon floated on mines in the district of the Sheba. None of these have proved of equal richness to it, but the principal disadvantage which they have had to contend against has been bad management. Men have been appointed to the management of mines through the interest of promoters or directors who had not the most elementary knowledge of the science of mining.

As a profession, the future offers a great opening for the science of mining, and practical people are urging that schools for the study of mineralogy and the domestic economy of mining should be established. Barber-

ton was the first of about a dozen towns in South Africa which have sprung into existence through the development of mining enterprise ; it is situated on the slope of the de Kaap valley, in the north of the district of Lydenburg, a network of mountains varying in altitude from 3,000 to 8,000 feet above the level of the sea encircles it, and it lies stretched beneath one long continuation of gently undulating plain 20 miles long and 17 miles in breadth. It had long an uncanny reputation, and was known by the Boers as the valley of the shadow of death, and a kind of superstitious dread prevailed with regard to it. It has outlived this reputation, and its township has proved as healthy a place of residence as any in South Africa. The scenery in its vicinity is unrivalled for its grand and imposing character. It carries a lofty impressiveness with it that stirs the mind with an overpowering and reverential awe, and one seems to inhale deep draughts of a subdued delight, to stand, as it were, in the Holy of Holies, wherein to bring the thoughts of every day were profane. It seems as though here were a great unfelt presence, and in it we are unconsciously truer, nobler, reaching more nearly to the ideal which is the type of humanity, though as we race for the sordid things of earth, we mock it for a poet's fancy. In these grand and untenanted solitudes of nature there is a subtle sympathetic vibration that in its very essence utters a language to man. It is a solemn and a sweet conception, and the material element of humanity seems less potent in the thought that to man alone does nature speak, and to him unfold the great mysteries that are enshrouded with a history that excites all his faculties of curiosity and admiration, and

yet answers no word to the revelation he would fain know of their origin.

For a terse and telling description of the de Kaap valley I will quote to you the idea it awoke in the mind of one writer. He says : "Twenty-six miles from Barberton one can look down upon the whole of the de Kaap valley, a glorious sight at any time. I saw it at sunrise, 4,500 square miles of mountain, hill and valley, suffused with the rosy flush of dawn, a vast jumble of hills looking as though it had been the play-ground of the Titans." But I must leave Barberton, with its mountains of reefs and majestic natural features, and ask you to travel with me 300 miles in a southwesterly direction, and 30 miles south of Pretoria we find ourselves in another district of the Transvaal, where the physical character of the country bears no resemblance to what I have just described. It is an elevated plateau 6,000 feet above the level of the sea, stretching out in one continuation of undulating plains, diversified only by long lines of low hills, looking in the distance like crusty eruptions. This country is characterized as high veldt, that is high land, and had hitherto a value only as summer pasture for cattle. It is now the site of a handsome town, Johannesburg, and of one of the richest and most wonderful gold fields in the world. The town grew with such rapidity, and was built of such a substantial character that it has completely outstripped any of the experiences of California or Australia. In less than two years its population had reached the number of 50,000, and newer towns were laid out on its outskirts.

The character and magnitude of its mining enterprise are marvellous, five or six hundred mines are in the hands

respectively of companies. The aggregate production of gold in 1888, attended with all the difficulties of early development, was valued at £1,000,000 sterling. The shipments of gold are now averaging 30,000 ounces per month, but a vast increase of power is being added to the batteries, and this it is calculated will increase the production to three or four times this amount. The output of gold for the month of July, 36,000 ounces, was on exhibition at the Paris International Show. Vast shipments of gold mining machinery are imported to Africa from this country and Messrs. Fraser & Chalmers of Chicago are getting to be household words out there. The occurrence of gold at Johannesburg has excited considerable geological speculation, and its existence there is regarded as of a singular character. The reefs are not of the quartz formation as at Barberton, neither are they of the same difficult nature to deal with; they are a composition of pebbles, water-worn stones and quartz, forming a conglomerate which is cemented together by sand, and on exposure to air it crumbles to gravel; the gold is easily disintegrated. The Boers named the composition "bauket" on account of its resemblance to a sweetmeat which is somewhat in appearance like the almond rock, and the illustration is very apt.

Scientific theory assumes that the tract of country in which this gold formation exists, was in ancient times a sea beach, the gold was deposited in fine grains from the sea water, each layer being parted by a division of sand, in the ages which ensued the strata became consolidated and a mighty upheaval took place, tilting up the whole sea beach, so that the strata formerly lying in a

horizontal manner are now found perpendicular, extending downwards to depths not yet gauged. The evidence of the volcanic fire is patent in the conglomerate mixture.

There is practically no limit to the dimensions mining operations may assume in South Africa. There are yet illimitable stretches of country open to exploration in which the indications point to an inexhaustible supply of the precious metal, while silver, copper, lead, iron and coal bestrew the country. The coal formation is probably greater than exists in any part of the world. Geologists speak of the distribution of mineral wealth in South Africa as eccentric, because it occurs in unexpected places and under novel conditions. Mr. Penning, a geologist of some eminence, who has devoted many years to scientific observations in South Africa, believes that very large beds of gold will be found ; he assumes this from a theory which his experiences have led him to formulate, but its truth remains for actual demonstration. As I have stated, the first discoveries of gold were made in the eastern division of the Transvaal ; 300 miles southwest of this occurs the gold formation, which makes Johannesburg ; 70 miles south of this a continuation of this formation is found extending beyond the Vaal River, and it is now practically demonstrated that a great belt of gold-bearing country stretches across the Continent from Delagoa Bay on the east, to Walfisch Bay on the west. The development of so vast a mining industry in South Africa has contributed to the prosperity of every section of the country ; a capital of £20,000,000 is now invested in mining in the Transvaal, a fact which gives it a position of foremost impor-

tance. With a large surplus revenue in its coffers it is prosecuting public works that will soon bring it into closer contact with the outer civilized world. The first section of the railway from Delagoa Bay is completed, and though British interests have brought a force of influences towards obstructing it, the tide of circumstances is too powerful in its favor, and it will draw the bulk of the trade from the republics. All religious denominations have free scope in the Transvaal, and educational advantages will enter into all the lives of the Boers of the rising generation. Government schools are established in all the towns; the Volksraad recently voted £20,000 for the purpose of erecting a college; £100 a year is granted by Government to any English private school in which Dutch is included in the curriculum, and this interchange of language is making its influence felt towards removing the intolerance and prejudice with which English and Boers regard one another. Looking back a few years at the Boers, living in their isolated and pastoral simplicity, cut off from all advantages of education and civilization, it seems almost impossible to realize the rapidity with which changes come about, and that a few years more will rank them in the confraternity of nations. In this lies the fruition of the hope which animated the early pioneers of 1688, whose spirit has filtered through the successive generations, leading them to endure untold suffering in preference to the sacrifice of their inborn independence. The reflection is not without a lesson, and it embodies the principle of a great purpose being the ultimate destiny of humanity.

Mr. Kruger is serving his second term of office as

president since the restoration of the Transvaal to the Boers. He is pure and simple a son of the soil, his parents being of the pioneers who abandoned the Cape Colony in 1835. He is a man of few educational advantages, as we understand them, but circumstances have bred in him a strong capacity for government. He has been compared in character to the old Scotch Covenanters who went about with the Bible in one hand and the sword in the other. He is a man of severely religious principles and is one of a sect called Doppers, a strict body of Dutch Protestants, peculiar in dress, manners and way of living; they correspond to the Puritans. Among the Boers, whose entire confidence he possesses, Mr. Kruger is known as "Oom Paul," Uncle Paul. At the time of the British occupation of the Transvaal he made two journeys to England to induce that government to undo the act of annexation, and he was the central figure in the Boer war and in the conduct of the peace negotiations.

He is regarded by outsiders as a man of strict integrity and strong common sense, and he has shown peculiar ability by the way he has adapted his rule to newer conditions; he has suddenly been called upon to regulate the affairs of an alien population of adverse sympathies and ambitions, 50,000 English who have flocked into the Transvaal owing to the recent discoveries of gold. He has displayed a peculiar tact in identifying his government with their interests, but he shows a firm disposition to resist the spirit that worked to the overthrow of his predecessor, President Burgers, though at times it does not leave him without anxiety.

The native tribes of South Africa are numerous.

Their government is chiefly of the patriarchal order. The stringency of their laws is a necessity, death is the punishment for infringement of these—for which their state can provide no prisons.

The morality of natives and the peaceful relations of domestic life find no parallel in civilization. Some of their customs are analogous to the Jewish, and coming to a later date others are not unlike what were common among the ancient Highland clans, and their superstitions, beliefs and practices in witchcraft are like those current in England in the time of James I.

The savagery of the natives is served up to excite our horror, and yet the refined cruelties of civilization would seek in vain for a counterpart amongst them. Human nature is the same in every condition and the brutal element is no less apparent in the state called civilization as contrasted with barbarism. The general disposition of the natives is peaceable. A simple diet and constant out-door life give them a vigor of frame and an exuberance of animal spirit that constitutes a great measure of happiness. Their reputed savagery consists to a great extent of the defense of their rights, which in the presence of Europeans they dread are assailed.

Their future opens a wide field for genuine philanthropy, and the first inception of civilization should be based on an industrial system. The less of the shadowy and vague they are taught the better, its tendency is to demoralize them, for like children, and men too, they are more susceptible to example than precept.

DEFINITIONS OF GEOGRAPHICAL NAMES WITH INSTRUCTIONS FOR CORRECT PRONUNCIATION, FOR THE VAR- IOUS HIGHER SCHOOLS.

A SUPPLEMENT TO EVERY SCHOOL GEOGRAPHY.

BY

KONRAD GANZENMÜLLER, Ph.D.

In the foreign geographical names

a	sounds	always	like a in father =ā (a long), or.
			“ a in fat =á, ä (a short);
e	“	nearly always	“ a in fate =ē, or
			“ e in met =é, ě;
i	“	always	“ i in marine =ī, or
			“ i in pin =í, ĭ;
o	“	“	“ o in note =ō, or
			“ o in not =ó, ő;
u	“	nearly always	“ oo in room =ū, or
			“ u in bullet =ú, ů.

—=vowel long ; ' =vowel short, but accented ; “ =vowel not accented.

ā = Montāna	Santiāgo	(Bāden)	Strāssburg
á = Chārleston	Carácas	Hārtford	Hālle
ē = (Maryland)	Montevideō	Hastings	Brēmen
é = Frédericksburg	Cayénne	Shéffield	Brésiau
ī = (Greendale)	Lima	(Leeds)	Berlīn
ĭ = Middletown	Quíto	Bristol	Línz
ō = Dakōta	Bōgotā	Hōlywell	Rōme
ó = Róckford	Orinóco	* London	Bōnn
ū = (Liverpool)	Angostūra	(Siracūsa)	Jūra
ú = Lake Sūperior	Acapúlco	(Cúxhafen)	Ulm.

* rather *Lúndun*.

GREEK ALPHABET.—LATIN CHARACTERS,

α β γ δ ε ζ η θ ι κ λ μ ν ξ ο π ρ σ ς τ υ φ χ ψ ω
a b g d é z ē th i k l m n x ó p r s-s t y ph ch ps ð

Α Β Γ Δ Ε Ζ Η Θ Ι Κ Λ Μ Ν Ξ Ο Π Ρ Σ Τ Υ Φ Χ Ψ Ω
Α Β Γ Δ Ε Ζ Ε Θ Ι Κ Λ Μ Ν Χ Ο Ρ Σ Τ Υ Ph Ch Ps O

The Latin vowels *a, e, i, o* and *u* have always the sound as given above (long or short).

The Greek *a* and *ε*, — the Latin *a* and *i*; — *η* — *ē*, *ε* — *é*, *ω* — *ō*, *ο* — *ó*; — *ου* = *ū*; — *υ*, *γ* = *i* in marine, *γ* = *y* consonant.

αι, *ae*; *ει*, *ei* — *i* in pine; *αυ*, *au* — *ou* in house; *ευ*, *eu* — *oy* in buoyance.

γ, *g*, *Γ*, *G* sounds like *g* in girl; *θ* *θ* — *th* in thin; *ξ*, *χ*, *Ξ*, *X* — *x* in axe; *φ*, *Φ* — *ph* in phenomenon; — *χ*, *Χ*, *ch*, *Ch* has not a corresponding sound in English; it sounds as *a strongly aspirated h* — *ch*.

The Greek *γγ* = *ng*, *γκ* = *nk*.

' — sharp sound; ' — sharp sound, but muffled; ~ — long sound; ' — *h* (*ἡμ* — *hemi*); ' is mute (or inaudible).

ἅγιος (*holy*), νῆσος (*island*), μέγας (*great*); τρία (*three*) ζώνη (*girdle*), πόντος (*sea*); — βούς (*ox*), πύλη (*gate*).

Σφαῖρα (*sphere*), ἡπείρος (*continent*); ναῦς (*ship*), εὖξενος (*hospitable*).

Γῆ (*earth*), θερμός (*warm*), αἰς (*goat*), κεφαλή (*head*); — χαλκός (*copper, metal*).

Στρογγύλος (*round*), ἄγκων (*elbow*).

Geographical names are easily impressed on the memory, if their meaning is known; not all of them, but a great many, can be explained.

The word *geography* is derived from the Greek language; the Greek *γῆ* meaning the *earth*, and *γραφειν* = *to describe*; hence GEOGRAPHY = DESCRIPTION OF THE EARTH.

The Greek *σφαῖρα* (Latin *sphaera*) means a *ball*, *sphere*, and *ἡμ* *half*. From these we have the word HEMISPHERE for HALF THE GLOBE and we speak of the

eastern and the western, the northern, and the southern hemispheres.

From the Latin *globus*, a globe, and *planus*, flat, or plain, is formed the compound PLANIGLOBE, which is applied by some to a representation of the *hemisphere on a flat surface*.

In most ancient times the nations discriminated two halves of the earth;—the Assyrian *assû* means *sun-rising*, and ASIA=LAND OF THE SUN-RISING, or *land of the east, the Orient*;—the Phœnician *ereb*=(darkness or) *sun-set*; from this is derived EUROPE=LAND OF THE SUN-SET, or *land of the west, the Occident*.

EUROPE.

BALKAN PENINSULA.

GREEK: πόντος (Latin pontus) = *sea*, πόρος = *ford*, νῆσος = *island*, χερσόνησος (chersonēsus) = *peninsula*, ἡπειρος = *continent*, ἰσθμός = (throat), *isthmus*, ὄρος = *mount*, ποταμός = *river*, πόλις = *city*, πύλη (and pl. πύλαι) = *gate, door*; Ἑρμῆς = *god Mercury*, Ἀρτεμις = *the goddess Diana*;—ὁ κύων (gen. τοῦ κυνός) = *dog*, βοῦς (gen. βοός) = *ox, cow*, αἶξ (gen. αἰγός) = *goat*;—χαλκός = *copper (metal)*;—κεφαλή (pl. κεφαλαί) = *head*, κύκλος (cyclus) = *circle, (environs)*; νίκη = *victory*.

μέγας (fem. μεγάλη, neut. μέγα) = *great*, θερμός = *warm*, ἀξένος = *inhospitable*, εὖξενος = *hospitable*, ἅγιος = *holy, sacred*;—ἡ = *the* (fem. sing.), αἱ = *the* (fem. pl.); τρία = *three*;—πρό = *before, in front*.

The ancient name of the Black Sea Πόντος Ἀξένος, = *the inhospitable sea*, was changed, after many Greek colonies had been founded on its coasts, into Πόντος

Εὐξείνως, Latin PONTUS EUXINUS=THE HOSPITABLE SEA ; —BOSPORUS=" OXFORD," or *cow-ford*, so called because the fabulous Io was said to have crossed it as a cow ; —PROPONTIS, named from its position *in front* of the *Black Sea*, as well as of the *Ægean* ; —HELLESPONT=SEA OF HELLE, because here, according to tradition, Helle fell into the water and was drowned ; —KYKLADES (the Latin *Cyclades*)=ISLANDS OF THE CIRCLE, so named because they encompass the "holy island of Delos ;" —THE THRACIAN CHERSONESUS=THE THRACIAN PENINSULA, so called in distinction from the *Cimmerian Chersonesus*, or the modern peninsula of the Crimea ; PELOPONNESUS=THE ISLAND (or *peninsula*) OF PELOPS, who landed there from Asia.

EPIRUS=THE CONTINENT, as opposed to the neighboring Ionian Islands ; CAPE ARTEMISIUM=CAPE (*with a temple*) OF THE GODDESS DIANA ; —*Mount Athos* was called the HAGION OROS OR SACRED MOUNTAIN ; —KYNOSKEPHALAI (Latin *Cynoscephalæ*)=DOG'S HEADS (two ranges of hills having this appearance) ; Battle, 197 B. C. ; —THERMOPYLÆ=THE GATE OF THE WARM SPRINGS ; —AIGOSPOTAMOS=GOAT RIVER ; —ISTHMUS *of Corinth* (ISTHMUS, in English).

CONSTANTINOPLE=CITY OF CONSTANTINE (the Great), who made it his capital, A. D. 330 ; —ADRIANOPLE=CITY OF HADRIAN, Roman Emperor, 117 to 138 A. D. ; —PHILIPPOPOLIS=CITY OF PHILIP ; it was founded by Philip I. of Macedon, who reigned from 359 to 336 B. C. ; —NICOPOLI (in Bulgaria)=CITY OF VICTORY ; —MEGALOPOLIS (ἡ μεγάλη πόλις)=THE GREAT CITY ; —HERMOPOLIS (on the Island of Syra)=CITY OF HERMES ; —TRIPOLIZZA=THREE CITIES, so called from its being colonized

by inhabitants of three cities ;—PYLOS=THE DOOR, or *entrance*, a considerable port of the Peloponnesus ;—CHALCIS=CITY OF COPPER, or *city of ore* ;—The inhabitants of this city, which was on the Island of Euboea, founded colonies in Thrace, and these were called *Chalcidian cities* (αι Χαλκιδικαι πόλεις). From these cities the peninsula CHALKIDIKE (Latin *Chalcidice*) took its name.

From the word λευκος, which means *white*, was derived the name of the *Island of Leuca*=WHITE STONE, so called from the lime-stone rocks on its coasts ; from this word is also derived the name of LEUCTRA=THE WHITE CITY ;—μέτωπον=FOREHEAD, *front* ; hence CAPE MATAPAN, the *most southerly headland* of Greece ;—ιδμπευ = *to shine*. From this verb is taken the name of OLYMPUS =THE SHINING MOUNTAIN, its summit being covered during a great part of the year with snow ;—ἀκτὴ=*a steep coast*, and hence ATTICA, formerly Ἀκταή=COASTLAND ;—μάντις=*seer, prophet* ; μαντεῖον=*oracle*, and MANTINEA=PLACE OF ORACLE ; παρθένος=*virgin* ; THE PARTHENON (in Athens)=*the house, or the temple, of the virgin goddess ATHENE* ;—κυπαρίσσοι=*cypress* ; CYPERISSIA=PLACE OF CYPRESSES ; hence *Gulf of Cyperissia* (also named *Gulf of Arcadia*) ;—ὄλυνθος=*fig* ; OLYNTHUS=*the place, or city, of figs* ;—ναῦς=*ship* ; NAUPLIA=PLACE OF SHIPS ;—ναυπηγεῖν=*to build ships* ; and NAUPACTUS, now in an Italian corruption *Lepanto*, means A PLACE OF SHIP-BUILDING or *a dockyard* ;—ἄκρος=*the highest* ; and ACROPOLIS was *the citadel, the highest point of the fortified city* ;—πλατύς means *broad, or flat* ; and PLATAEA, therefore, is equivalent, to “THE BROAD FIELD ;” —*σπεῖρειν=*to sow, or to scatter* ; from this verb is de-

*These are now held to be uncertain.

rived the name of SPARTA=THE SCATTERED CITY, consisting of four or five open places.—The SPORADES, or SCATTERED ISLANDS, have the same derivation.

Doubt is now thrown on the derivation of the word *Salamis* from the Phœnician *salam*, peace.

CAPE KOLONNAES (formerly *Cape Sunium*)—CAPE OF PILLARS; on the highest point of this headland thirteen pillars of the ancient temple of Athene are to be seen; —MEGALOKASTRO=THE GREAT CASTLE (on the Island of Candia).

LATIN: *terra*=*earth, land*, and *medius*=*middle*; from these is formed the name of the MEDITERRANEAN SEA, from being, as it were, IN THE MIDDLE OF THE LAND;—*marmor*=*marble*; MARMORA is an island famous for its MARBLE *quarries*; hence *Sea of Marmora*;—from *palatium*, a *royal* RESIDENCE, or castle, comes the name of SPALATO, in Dalmatia.

ITALIAN: *mónte*=*mountain*; *negro*=*black*; *santo*=*holy, sacred*.

Mount Athos (the Greek *Hagion Oros*) is also named MONTE SANTO=THE HOLY MOUNTAIN, or *sacred mountain*;—MONTENEGRO=THE BLACK MOUNTAIN (“Black” here means rocky, or sterile).

SLAVIC: *gora*=*mount*;—*grad*=*castle*;—*belny*=*white*;—*tscherny*=*black*.

The principality of *Montenegro* is called by the Slaves TSCHERNAGORA, or THE BLACK MOUNTAIN;—BELGRADE=THE WHITE CASTLE.

TURKISH: *bálkan*=*mountains*, *dagh*=*mountains*;—*pu*=*river*;—*serây*=*palace, residence*;—*kāra*=*black*.*

BALKAN=MOUNTAINS; and the *Balkan Peninsula* is, therefore, *the mountainous peninsula*;—KARADAGH=

THE BLACK MOUNTAINS ("Black" meaning sterile);—
KARAPU=THE BLACK RIVER.

The palace, or *residence of the Sultan* in Constantinople takes the name of *Seray*, or *Serail*. Near the spring of the river of Bosna the Turks founded BOSNA SERAY=THE BOSNIAN RESIDENCE, now in a Slavic form *Serajewo*.

RUMILI (*Roumelia*) means *the* COUNTRY OF THE MEN OF RUM (so the Turks called the Greeks living in those parts); *Roumuni* (Rumanians)=*Romans*, whose tongue is very like Latin;—RUMANIA=COUNTRY OF THE ROMANS;—SALONICA is an abbreviation of THESSALONICA, the name given to the place by Cassander in honor of his wife, sister of Alexander the Great.

**Accentuation*: Zácyntho, Rhódopë Mountains, Táygetus, Herzegövína, Gálata, Jánina, Patrás, Scútari.

ITALY.

In the *Italian geographical names* the vowels *a, e, i, o*, and *u* have always the sounds, as given on page 516.

The *consonants* sound much as in English, but **c* before *a, o* and *u* is to be sounded like *k*;—** if *c* is to have the sound of *k* before *e* and *i*, an *h* (which is mute) must be inserted; *che*=*ke*; *chi*=*ki*.

†*c* sounds before *e* and *i* like *ch* in *charm*;—†† if *c* is to have the sound of *ch* before *a, o* and *u*, an *i* is to be inserted; *cia*=*cha*, *cio*=*cho*, *ciu*=*chu*.

It is the same with the letter *g*; *g* like *g* in *girl*, or like *j* in *John*.—Therefore:

k: *ca, che, chi, co, cu*; ; *ch*: *cia, ce, ci, cio, ciu*.

g: *ga, ghe, ghi, go, gu*; *j*: *gia, ge, gi, gio, giu*.

gl is pronounced like li in pavilion, and ng like ni in union; sc—sh, zz—ts.

Now, the *following*, like *other Italian geographical names*, will be easily pronounced with correctness:

Carràra, Málta, Spolèto, Palérmo; Toríno, Bríndisi; Ancòna, Campo Fórmio; Siracùsa, Abrúzzo.

Cremòna, Cápri, Ischlà, Còmo, Custózza;—Vercélli, Cívita Vécchia, Ajáccio.

Gran Sásso, Mònte Gárgano, Lago di Còmo, Gúastàlla;—Perúgia, Àdige, Lago Maggióre.

Cágliari; Legnàno; Scirócco (the hot wind); Abrúzzo.

ITALIAN: *isola*=*island*, *rivièra*=*coast*, *monte*=*mountain*, *lāgo*=*lake*, *canāle*=*canal*, *città*, or *ctvita*=*city*, *villa*=*village*; *sásso*=*rock*, *vènto*=*wind*; *chiāve*=*key*; *levante*=*east*, *ponènte*=*west*; *gran*, *grānde*=*great*, *maggióre*=*greater*, *rotóndo*=*round*, *vécchio* (fem. *vécchia*)=*old*, *nùovo*=*new*, *franco*=*free*, *bello*=*beautiful*;—*spartire*=*to divide*;—*di*=*of* (gen.).

ISOLA BELLA=THE BEAUTIFUL ISLAND (lying in the Lago Maggiore);—CAPE SPARTIVENTO=THE WIND DIVIDING CAPE;—MONTE ROTONDO (on the Island of Corsica)=THE ROUND MOUNTAIN;—MONTE NUOVO=THE NEW MOUNTAIN (it is formed of ejected masses, which were thrown up at the time of the eruption of Vesuvius, in 1538 A. D.);—GRAN SASSO (D'ITALIA)=THE GREAT ROCK (OF ITALY), the highest pinnacle in the Abruzzo;—LAGO MAGGIORE=THE GREATER LAKE;—LAGO DI COMO=LAKE (*of the city*) OF COMO;—CANALE GRANDE (in Venice)=THE GRAND CANAL.

RIVIERA DI LEVANTE=THE EASTERN COAST;—RIVIERA DI PONENTE=THE WESTERN COAST (the coast on the Gulf of Genoa).

CIVITA VECCHIA=THE OLD CITY;—VILLAFRANCA=THE FREE VILLAGE, lying southward of Verona (cessation of arms on the 11th of July, 1859, A. D.);—CHIAVENNA=KEY-CASTLE (it commands the highway over the pass of Splugen).

GREEK : ἄρμος=*harbor*, port; πόλις=*city*; ἄγκων=*elbow*, angle; ξιδήκη=*sickle*, δρέπανα=*sickle*;—νέος (fem. νέα)=*new*, ἄκρος=*pointed*, στρογγύλος (fem. στρογγύλη)=*round*, λίπαρος=*fat*; πᾶς (fem. πᾶσα, neut. πᾶν)=*all*; τρία=*three*.

SICILY was formerly named TRINAKRIA=THE THREE-POINTED *island* (from its form);—*Strongyle*, now STROMBOLI=THE ROUND *island* (it consists of a single conical mountain);—LIPARI ISLANDS=THE FAT ISLANDS (so called because the ancient inhabitants sold large quantities of alum and sulphuric salts).

Panormus, now PALERMO=(*all-harbor*), CONVENIENT HARBOR (so named from the wide gulf there);—ZANKLE=CITY OF SICKLE (the harbor is surrounded by a sickle-shaped neck of land); after the immigration of the *Messenians* from the Peloponnesus the ancient name of this city was changed into *Messana*, now *Messina*;—*Drepanum*, now TRÁPANI=CITY OF SICKLE (so called from the face of the peninsula, on which it is situated);—*Neapolis*, now NAPLES (the Italian *Napoli*)=THE NEW CITY;—ANCONA=(*elbow*), ANGLE (from its position in an angle of the coast; Greeks from Syracuse settled in this place, in 380 B. C.).

Φλέγρειν=to burn, φλεγραῖα=PLACE OF BURNING; hence the PHLEGRÆAN FIELDS, west of Naples, with extinguished volcanoes and hot sulphur-springs.

LATIN : mons=mountain, montium (gen. pl.)=of the mountains;—campus=plain, flos (pl. flores)=flower—

pes=foot, *pede* (abl.)=*on the foot*, *ostium*=(gate), *mouth*;—*eventus*=event;—*bene*=well,—*male*=badly;—*placere*=to please;—*cis*=on this side.

CAMPANIA=THE PLAIN COUNTRY; *Pedemontium*, now PIEDMONT=(*the country*) AT THE FOOT OF THE MOUNTAINS,—*Northern Italy* received from the Romans the name of GALLIA CISALPINA, or GALLIA ON THIS SIDE OF THE ALPS (it was inhabited by Gauls).

OSTIA=CITY AT THE MOUTH (so called from its former position at the mouth of the Tiber);—*Florentia*, now FLORENCE=CITY OF FLOWERS;—*Beneventum*, now BENEVENTO=GOOD EVENT (the original name of *Maleventum*, or *bad event*, was changed into *Beneventum* after the victory of the Romans over Pyrrhus, King of Epirus, in 275 B. C.);—*Placentia*, now PIACENZA=PLACE, or city OF PLEASURE (so called from its delightful situation).

EMILIA takes its name from the *via ÆMILIA*, the high-way built by the Roman Censor Æmilius Lepidus, in 186 B. C.

AUGUSTA: Many cities were named in honor of the Emperor Augustus;—*Augusta Prætoria*, now AOSTA, or AUGUSTA of the *Prætorians*, the imperial life-guard, was founded as a colony of veterans, in 25 B. C.—*Augusta Taurinorum*, now TURIN=*Augusta in the country of the TAURINI*.

CELTIC: *pen*=mountain; hence THE APENNINES=THE MOUNTAINS.

Etruria took its name from the ETRUSCANS, and is now known as TUSCANY—LOMBARDY=THE COUNTRY OF THE LOMBARDS, who conquered Upper Italy, in 568 A. D.—ALESSANDRIA, founded A. D. 1170, was named in honor of *Pope ALEXANDER III.* (*To be continued.*)

PROBLEM

OF INTEROCEANIC COMMUNICATION BY WAY OF THE AMERICAN ISTHMUS, BEFORE THE AMERICAN GEOGRAPHICAL SOCIETY.

NEW YORK, OCTOBER 20TH, 1889.

MR. PRESIDENT :—No contradiction having been offered to my communication under the above title, that this learned Society kindly permitted to be inserted in their BULLETIN for December of last year, I will leave the question to stand on its own merits.

Meanwhile I beg to be allowed, in the interest of science, to present some of the records of historical facts which led me to bring to light, if not a new, at least a long forgotten and most important feature in the geographical and geological knowledge of our continent; I mean the former existence of a free communication of both oceans through a natural separation between the Panamá cordillera to the North, and the Occidental range of the Andes to the South; the place where lies the *unique* available *passage* for a *tide-level canal* across the American Isthmus.

It was known, as every one conversant with the matter is aware, by the name of "the secret of the strait," which very appellation implies that it was acknowledged to exist, not so deeply hidden, however, that through proper and diligent search, it could not be unveiled. In fact, its existence was hinted at, centuries

before the discovery of America by Christopher Columbus; that is to say, as far back as the traditions of ancient Egypt and Greece, referring to those two faraway *immense* islands spoken of in the Dialogues of Plato.

It was indicated by the generic names of "Northern Darien, great river of Darien and Southern Darien," given in the oldest MS. Spanish maps to the present "Gulf of Uraba, river Tuyra and Gulf of San Miguel," respectively.

Its location had been pointed out, as early as 1550, by the great Portuguese navigator, Antonio Galvão, as a round about route from the Atlantic to the Pacific.

It was practically illustrated in the beginning of 1680, by the crossing of above 400 filibusters, in 18 large canoes, under the guidance of the Indians; a fact which I found particularly described in original reports at the Hydrographic Depot of Madrid; repeated in the MS. memoirs of the Rev. F. Jacobo Nalburger, S. J., missionary in that territory from 1741 to 1749; and, I am told, stated also in the History of the Buccaneers printed in London.

Finally, the choice of the Darien has also been recommended in general terms by the illustrious Baron von Humboldt; and most pointedly by the eminent geographer Admiral Fitzroy; so much as to name the rivers "*Paya and Cacarica*," as forming the connection, across a low, narrow tract, between the Tuyra and the Atrato. (P. 185 of Vol. XX of the Royal Geo. Soc.'s Transactions in 1850.)

My confirmatory survey of the ground in 1866 was not therefore presented as a discovery proper, but rather as the unearthing from the dust of the archives

of a secret jealously kept by the former Governments of Spain, for the security of their colonies; and secured by a decree of the penalty of death against any one who deviated in his voyages up or down the Atrato from the straight course of the main stream. This proved an effectual bar to the trader's greed as well as to the explorer's curiosity; till the question was dropped and forgotten during the protracted war of Independence.

Now it may readily be understood how the gradual accumulation of drift mud, sand and rocks, together with big trees, innumerable weeds and every kind of detritus brought down by the frequent freshets of the mighty river, and by the many affluents of the "*American Strait*"—and incessantly driven back towards its Eastern terminus by the impetuous high tides of the Pacific,—have formed that comparatively slight obstruction which separates, at present, the two oceans. The subsequent slow upheaval which, according to the savant Sir Chas. Lyell, has raised the ground all along the Pacific coast of South America, helped by the marvellous vegetation of the Tropics, may well have formed also those irregularly disseminated hillocks or mounds that cover both banks of the river Cacarica at its junction with the lagoons.

Again, to refer to more recent opinions, Rear Admiral Charles Davis, at p. 16 of his report to Congress in 1866, speaking of my communication about my proposed route, and of its intended resurvey by "competent authority," cites Admiral Fitzroy and draws himself the line via Paya in his general map. And finally, Dr. Maak of Harvard University and geologist of the U. S. Exploring Expedition of 1871, officially reports that

evidence exists in the tertiary strata, that the two oceans freely mingled their waters through the present valley of the Tuyra as late as the pliocene period; a learned opinion which is the more to be noted because it shows that the conclusions of science so completely agree with the tradition.

All which tends to confirm the exactness of the data that I have furnished since so many years; and as I hold that science has neither nationality, nor political nor "moneyed" creed, I leave the question open to the judgment of the learned world, and stand by my old device "*Magna est veritas, et prævalebit,*"—*tardé!*

I am, Mr. President, very respectfully,

ANTHONY DE GOGORZA.

THE RAIYÂN MOERIS.

BY

COPE WHITEHOUSE.

The Journal of this Society (Vol. XIV.) contains, under the title of Lake Moeris, the results of those early explorations in the Fayoum and the adjacent desert which have now assumed a transcendent importance. The claim there made for the great inland sea has been fully justified. The vindication of the integrity and intelligence of the ancient historians is complete. The splendid engineering works of remote antiquity dazzle the eye and stimulate the imagination of statesmen and engineers, who study the arid plains of the Western States or watch the turbulent floods of the Father of Waters.

Diodorus, the Sicilian geographer, thus describes what he saw during his visit to that part of Egypt: "A little south of Memphis a canal was cut for a lake, brought down in length from the city forty miles. Its usefulness was worthy of all admiration and the magnitude of the work incredible. The circuit of the lake is said to be four hundred and fifty miles; and, in many places it is three hundred feet in depth. Who is he, therefore," he exclaims, "that considers the greatness of

NOTE.—This paper contains the substance of an address made before this Society on Nov. 11, 1889. It was illustrated by lantern slides which gave the complete cartography of Middle Egypt, including hieroglyphic, Greek, Arabic and modern maps; as well as by original views of the Bahr Jūsuf, the Fayoum, Raiyân and Muellah depressions, and the adjacent desert.

this undertaking and does not feel impelled to ask : ' How many thousands of workmen were employed, and how many years were spent in completing it ? ' Yet, considering the benefit and advantage brought to Egypt by this great work, none ever could sufficiently extol it according to what the truth of the thing deserves. For inasmuch as the Nile never kept to a certain and constant height in its inundation, and the fruitfulness of the country depended upon its uniform and regular supply, this lake was formed to receive such water as was superfluous, that it might neither immoderately overflow the land, and so cause marshes and stagnant ponds, nor, by flowing too little, prejudice the crops for lack of water. Accordingly the king dug a canal from the Nile to the basin, ten miles in length, and three hundred feet in breadth. Into this the water was allowed to run at stated times, and at other times it was diverted and turned over the cultivated land for seasonable periods, by means of sluices which were opened or closed, not without great labor and cost. This lake continues to the benefit of the Egyptians for these purposes to our own time, and is called the Lake of Myris or Meris to this day."

The chief facts given by Diodorus had been anticipated by Herodotus and were confirmed by Strabo and Pliny. It was thus that the attack upon the credibility of Herodotus in reality involved the whole ancient world. Readers and purchasers of books must be held responsible for the demand which creates the supply. Cæsar and Cicero, as well as Plato and Aristotle, would share in the condemnation, although actual mention of Moeris found no place in their works.

The plain account had been flatly contradicted. It was supposed that the observer "embraced in his measurement the whole water system of the Fayoum," or had "confused units of measure," or "the direction of the canal with that of the lake." The accounts of Herodotus (B. C. 454), Diodorus (B. C. 20), Strabo (B. C. 24), Pliny (A. D. 50-70), were declared to be "widely different" and "irreconcilable." Finally the scientific world came to the unanimous conclusion that Moeris was "an artificial reservoir, forty-five miles round, twenty-five feet deep at high Nile and drained at low Nile when the waters had been used upon the fields of the Fayoum. It was everywhere stated that the position of the lake had been satisfactorily determined, in this sense, by M. Linant de Bellefonds. The map reproduced from the "Egypt" of Canon Rawlinson (1881) shows the accepted view.

The French Government had also printed upon its map (1882) that the Memoir of M. Linant contained all the information which could be desired. The name of Rawlinson, identified with wide-spread geographical knowledge, a thorough acquaintance with Herodotus and the current researches recorded by the Royal Geographical Society, is sufficient to show that no suspicion of error on Linant's part was then entertained.

It is not necessary or expedient to trace here the successive steps which have resulted in our possession of an immense body of accurate observations made by a series of experts. Cartography, geology, history and archæology are represented by men of high rank, while from the Premier of Egypt to the Prime Minister of Great Britain, documents have been issued showing

that the suggestions, embodied sometimes in little more than a pregnant phrase, are deemed to have a bearing upon the welfare of Egypt, the future of Africa, and the imperial interests of more than one Great Power. "Beside Lake Moeris," said Herodotus, "lies the Labyrinth. I visited this place and found it to surpass description." Beside the Fayoum and Raiyān basins in their physical conditions as developed by the engineer lies an edifice which has some of the romantic elements of the palace of Aladdin. The lamp which traces its walls reflects a thousand figures weird, and yet with many a familiar feature. In its twelve halls are throned twelve patriarchs. The history of one, at least, who dwelt on the banks of the Nile, is a household tale on the slopes of the Himalayas, and the prairies of the West. Into these sinuous passages and recondite researches we may not now enter. The Rabbi Benjamin of Tudela points to this "land of the West" (Pi-Tum), and says: "Here is Pithom. Here are the remains of the buildings erected by our forefathers." Jablonski could write, but dared not publish, that the Fayoum was the land of Goshen, vainly sought by the modern scholar in the pestilential marshes of Menzaleh, or the scant strip traversed by the Ismailia canal. The only questions we are authorized to discuss are those purely geographical points, which were outlined by the President of this Society in the remarks in which he summarized the issues raised in the former paper on Lake Moeris. He assumed that the geographical features set forth with such detail and minuteness were accurate and trustworthy. Further evidence on this point will be duly marshalled and original authorities cited. An examination had been

made of all the cartographical evidence from the time of Claudius Ptolemy. The fac-simile of the map of Egypt from the edition printed in Rome in 1508, and similar to several of those manuscripts which abound in the Vatican and other European libraries, can now be compared with an official map, stamped with the approval of the International Jury at the Paris Exposition.

The undoubted existence of comprehensive and stupendous works, still used for their original purpose after the lapse of 4,000 years, shows what estimate should be formed of the capacity of the rulers of Egypt to design and its inhabitants to accomplish. It has an important bearing upon current philosophy and the strangely rash and incoherent assertions of rate of progress and development.

The wish of your President has been fulfilled. The condition of things in Egypt has brought about a survey of this neglected region, not merely with a view to gratify curiosity in respect of its past condition, but to point out the means of guarding against calamitous results from the action of the Nile. These investigations are apparently on the eve of being turned to practical account, and a part of the surplus of the inundation diverted into the Wadi Raiyān. The lesson has already been taken to heart in the New World. The Mississippi and the Rio Grande will yet be treated as the Nile. The engineers, who trace back their technical education in geometry to the engineering schools in the University of Memphis, are scanning with interest the tradition that makes the Patriarch Joseph the founder of their profession, and studying with profit the mighty works that were done of old and still endure.

Curiosity has, unfortunately, also been directed to the archæological treasures of this region. Savage attacks have been made upon its monuments, and thousands of tombs rifled with hideous disregard of decency. It tempts one to deplore that so much had to be said, and to guard with jealousy the secrets still undisclosed. It is for the members of this Society to use their moral influence to secure to Egypt the undisturbed possession of the treasures accumulated in the past, as well as to aid its industrious peasants to obtain such further benefits from the Nile as will put the government once more in a position to devote its surplus earnings to the advancement of art and science within its borders, and extend humanizing influences through Central Africa.

The accompanying map—reduced from the large map 1:50,000—prepared in the Department of Public Works in Cairo, succeeds and replaces several smaller maps, resulting from the surveys made by me, or by engineers put at my disposal by the Egyptian authorities.

Colonel Ardagh, C.B., R.E., then chief of staff to the British army of occupation, but now holding the high and responsible position of Secretary to the Viceroy of India, was the first English officer to visit the Wadi Raiyān. At the meeting of the British Association in 1887, before the London Chamber of Commerce in 1888, and in the Proceedings of the Royal Geographical Society in 1889, he has enforced the importance of the Raiyān depression. It was largely due to his support that the Irrigation Department consented to further an official examination of this area. The scientific world owes him this addition to the large debt which it acknowl-

edges for his topographical labors elsewhere, and his map of the neighborhood of Tel el-Kebir.

Captain Surtees, for several years on the staff of the Egyptian army, whose military services had been fully appreciated, after his return from the mission to Central Arabia, on which I accompanied him, was detailed in 1887 to examine the Fayoum in the strategic aspect, which had been outlined to General Sir Evelyn Wood, and to join me in an expedition to settle the western limits of the two depressions. The results are recorded in official documents in the Foreign Office, and in the Proceedings and on the map of the Royal Geographical Society for that year.

The Paris Geographical Society had early recognized the probable value of these investigations. In 1886 it preferred a request for an address, which, in compliance with their wish, was made without notes, but a summary was published in their Bulletin.

The *Exposition Universelle* offered an opportunity of exhibiting a number of maps, surveys and official documents. These satisfied the experts, who represented the various countries of the world, that the generous confidence so liberally extended to a stranger had materially helped to protect and mature the ideas which had, in fact, first found shelter in the pages of the *Revue Archéologique*. This collection of maps included a portion of a hieroglyphic map, whose central part is preserved at Būlaq. The remainder was found in a country house near Lincoln, England, and the fact announced in a volume offered by Egyptologists to Dr. Leemans. At the Congress of Orientalists in Vienna, Dr. Pleyte of Leyden, who was the first to embody the Raiyān basin

in any map published on the Continent of Europe, brought to my notice a papyrus in the possession of Dr. Reinisch. It was readily identified as the fragment stolen from the museum at Būlaq, of extreme interest in cartography, and whose probable destruction had long been lamented.

Various reports on the Raiyān Basin by Sir C. C. Scott-Moncrieff have less value than would have been anticipated from the world-wide reputation of the author of "Irrigation in Southern Europe." It naturally seemed to him scarcely within the bounds of ordinary human events, that, in a brief interview, one whom he had never seen before, who was to leave Egypt the next morning, should draw a few lines on a scrap of paper, add and subtract a few figures, and offer to the future Under-Secretary of State for Public Works, without any condition or apparent expectation of reward, an unrivalled occasion for enhancing personal reputation, saving a distressed people, and reconciling in one great enterprise the conflicting interests of France and Great Britain. Whether those lines were worth hundreds of millions of dollars is still a matter of calculation. The estimates made by Sir C. C. Scott-Moncrieff, which at Sir Evelyn Baring's suggestion he published in the *Journal Officiel*, a year since, were—confessedly—intended to minimize the dissatisfaction expressed at the delay in the actual execution of the project. They showed a net profit of ten per cent. on the estimated cost, but must be considered as the work of the statesman, not of the engineer. He treated the death-rate of Cairo—92.7 per 1,000 in July—as a *quantité négligeable*, and the obligation to furnish water to the Suez Canal Company, as well as to

the peasants of the Gizeh Province, for which they have long been annually taxed, as the payment of a debt, and therefore not a source of additional revenue. The quittance of these and similar obligations was excluded in the estimate of profit to be obtained from the execution of the scheme.

Lieut.-Col. Western, C.M.G., R.E., Director-General of Works, was charged in 1887 with an examination of the whole project. His great ability and thorough knowledge of construction have been proved, notably at the Barrage, but also in many minor works. If his estimates of cost seemed large, and even the enormous area of three millions of acres, to be added to Egypt by the creation of the Raiyān Reservoir, capable of increase, his invaluable reports are not to be criticised. His personal examination of the region with further facts have combined to modify, to some extent, his conclusions in a more favorable sense. These reports constitute the basis on which everything has since proceeded. They were the complete official acquittal of those who had preferred the statements of Herodotus and the maps of Cl. Ptolemy to those of Dr. Lepsius and the modern cartographers.

Lieut.-Col. Ross, as Inspector-General of Irrigation, has, like Sir C. C. Scott-Moncrieff, been in a measure hampered by his official position in the expression of opinion. His map of the Fayoum and Raiyān depressions is constantly receiving new items of great interest, especially in that northern part where a large area of cultivable land was found by me, and brought to the notice of the British and Egyptian Governments at a time when the refugees from the Sudan were demanding aid to establish new homes. To Colonel Ross

was due the diagram of the rise and fall of the Nile for fourteen years, which was a prominent feature in the exhibit in Paris; as well as countless suggestions and continuous moral support.

The relief-map of the Raiyān Basin—horizontal scale 1 : 100,000; vertical scale 1 : 10,000—made by M. Muret under my supervision, aided by photographs, was so striking in its contrasts, that it completely broke up, in the minds of all who studied it, the fatal error, so universally entertained, that the desert traversed by the Nile is a sandy plain. The difference of scales is unusually great, and therefore far less deceptive than those maps in flat relief, which seem to the inexperienced eye to give a natural appearance to the mountains and valleys.

There was also submitted for the examination of geographical experts a large map of the North-eastern Delta with the areas actually productive or capable of being rendered cultivable by an additional supply of water free from alluvial deposit. This map was due to Mr. Garstin, who, as Inspector of Irrigation for the Eastern Delta, is well acquainted with the region.

Major Brown, R. E., is in charge of the provinces of Middle Egypt, traversed by the Bahr Jūsuf or River of Joseph. Why should oriental scholars have overlooked those written traditions, which, dating back from the 9th century to the period when the Book of Genesis first embraced the 49th chapter, have always assigned this work to the Hebrew Premier, whose sagacity founded the temporal fortunes of his race? The claim put forward in behalf of Saladin—chivalrous opponent of Cœur de Lion—comes nearly two cen-

turies after Masudi, in A. D. 956, had described the island and habitation of Joseph, the province of *Ben Jusuf*, as it is suggestively termed on Mercator's map, and the Beni-Suef of our own day. Several beautiful photographs, taken by Major Brown with artistic taste and technical skill, illustrated the lecture delivered before this Society and the expeditions we made, in which we followed this great stream. Like the reputed author of its existence, it bears a name to show, that, separated from the parent Nile, it takes away the reproach of barrenness from a large district and adds yet another province to the area assigned by Semitic tradition, ancient and local, to the shepherd kings and their allies—the Beni-Israel.

Mr. Marshall Hewat is Inspector and Director of works in the Fayoum. The photographs showing the palace of the Mūdīr were proofs of the hospitality so often enjoyed, and of the information obtained directly from him as well as from the governors—my old friend Murad Pasha, and the present Governor, an accomplished and learned professor, Latif Bey Salem.

Nubar Pasha had at various times urged upon His Highness, the Khedive, and his immediate associates in the government of Egypt, the necessity of providing an additional supply of "*sefi*," or "low Nile" water, himself prepared with a project for a great dam at Silsileh. The danger of creating a storage reservoir by a dam across a large stream is well known. The engineer seeks, by preference, to use some supplemental stream, issuing from a lateral valley.

The Silsileh project has of late been associated with the name of Mr. de la Motte. It was, however, so ob-

vious a means of accomplishing a desired object that it had been mooted since the expedition of Bonaparte, and its advantages and serious dangers carefully weighed by successive ministers, especially by Ali Pasha Mubarekh, when Minister of Public Works. The Khedive opposed it, with characteristic soundness of judgment. He has recently been termed by the late Consul-General of the United States a model prince. His sons will soon visit the United States, and this Society will, without doubt, take that occasion to express their appreciation of this ruler of Egypt, who is the devoted husband of one wife, an affectionate father, profoundly religious, wisely administering his private affairs, and discharging his duties as Viceroy, under circumstances of extreme difficulty, with a tact and zeal which have won the respect of all who know him, and the loyalty of his people.

In the *Zeitschrift der Gesellschaft für Erdkunde* (Berlin, 1886, No. 2), Dr. Schweinfurth has given an account of his expeditions through the Muellah, Raiyān and Fayoum depressions, with a map. It is in the form of a letter to Dr. Ascherson, and contains much valuable geological information. It will be remembered that it was stated in the Journal of this Society, that I had received information of the existence of a temple in the desert to the north of the Birket el-Qerūn. Its position was indicated to the north of the ruins described by Dr. Lepsius, at Dimeh. The engineer, however, whom I had taken with me to Dimeh, insisted upon my agreement to return him to Medinet before a given date. Dr. Schweinfurth found the building without difficulty, and enjoys the credit of having been the first

European to visit and describe it. Accompanied by Lieut.-Commander Ackley, U. S. N., I visited and photographed it in March, 1889. It is a rectangular building, about 70 feet in length, 25 in depth, and 18 in height. The photographs were examined by MM. Chipiez, Maspero and Naville. They consider the structure, in all probability, of extreme antiquity, *ca.* B. C. 2,000. Its geographical importance is very great. Situated five miles from the shore of the present lake, at the level of high Nile at el-Lahun, and at the foot of the steep terraces which bound the depression to the west, it must have been constructed when the Fayoum was a vast lake. It would then have been a point of military importance on the desert road from the south to the Natron lakes or (the ancient) Alexandria.

Dimeh is also detached ; so that it would appear as an island rising with steep sides out of the lake, where it was deepest. If Diodorus states that he saw such an island, crowned with two pyramids, against which were colossal seated figures, and a tomb, where the water was 300 feet in depth ; and, if in the Fayoum there is a detached hill, with a long horizontal street or quay, covered with immense masses of unburned brick and stone, which, when the Fayoum served as a back-water and flood-escape for the Nile, may have corresponded to this description, is it creditable to insist any longer that the statements of the Sicilian geographer and traveller are false ? Herodotus before, and Pliny afterwards, refer to the same remarkable feature. The pyramids of el-Lahun and Hawara, at either end of the Fayoum canal, are of unburned brick. The island-pyramids may have been of the same material. In any event the

stones at Biahmu ought never again to appear in any argument as in any way identified with these pyramids, or with the statues as *in situ*. It is an elementary rule of evidence, which is constantly ignored by untrained minds, that you cannot discredit your own witness. The only knowledge of these structures is derived from the written statements of Herodotus, Diodorus and Pliny. The whole story may be rejected, but it is puerile to admit their existence and then to identify pyramids and statues with extant remains on the upper terrace of the cultivated land, when the only important fact was the indication which the island furnished of the great depth of the "excavated" or "eroded" depression.

The contours of the Fayoum have not yet been completed. It was urgently impressed upon Sir C. C. Scott-Moncrieff, in 1886, that lines should be run which would determine the entire area of the alluvial deposit of the Nile, from Assuan to the Mediterranean. It might have been done without appreciable cost to the Egyptian Government had my offers been accepted. Unless, however, an engineer had been lent to me who would be responsible to the Government for any error, neglect or disobedience of orders, the Public Works Department would not have accepted the work as final. Some such survey will, it is believed, be undertaken at no distant date.

The contour of high Nile, quitting the Nile Valley at el-Lahun, passes to the south of Gharaq, enters the Wadi Raiyān, encircles the Wadis Lulu and Safir, re-enters the Wadi Raiyān, crosses the entrances of the Oases of Muellah and Khoreif, and returns into the Fayoum after girdling an area of 250 square miles. This same contour, of R.L. + 30, would continue

round the west of Gharaq towards the north and east, and then passing westward to the south of Qasr Qerūn, turn to the north, and, sweeping out into the desert behind Dimeh to the ancient temple, curve towards the east, and return to the south and the Valley of the Nile along the foot of the hills which overlook the ancient bed of the Bahr Wardan.

It may be said that this line when it had reached el-Lahun and the cultivated land in the province of Beni-Suef, would, especially if the minor sinuosities were measured, attain a length of 450 miles. The entire basin, thus encircled, would apparently cover over 1,300 square miles, and a large part of it would be much below the level of the Mediterranean.

This was the immense natural back-water of the Nile, which, according to Semitic tradition, was divided between the fertile province to the north, when el-Hūn or Phiom (the Sea) became el-Fayoum (Alf-iom, the land of a thousand days), and the Raiyān Moeris, or reservoir to the south.

If the Arab tradition is correct, King Raiyān invested Joseph with the insignia of Prime-Minister as a reward for about 400,000 acres of land, perennially irrigated. Manetho says that this region was abandoned in the religious wars which broke out at the time elsewhere fixed as the birth of Moses. The Birket el-Qerūn rose, if not then, subsequently. The Lake of the Horns submerged once more the district of Qerūn (Heroon-polis) to the upper plateau, where repeated use of the word Sen points to Ha-Sen (Gesen, Goshen), Asenath, the wife of Joseph, and Arsinoe, its Ptolemaic name. Those united depressions formed the Moeris of Herodotus.

The region might well be described, in the fifth century before our era, as a vast reservoir and back-water from the Nile, with a maximum level above low Nile at Memphis, fifty miles south-west of that city, about fifty fathoms deep, longer than its width, extending from north to south, surrounded by the Libyan desert, with an indented coast as long as the smooth sand-banks which form the Mediterranean shore of Egypt, blue, full of fish of twenty-two species, with flood-gates at the double mouth of the canal, whose embankments and clearance from silt annually cost \$50,000 (£10,000), by which the engineers relieved Egypt from a dangerous flood, or stored up and distributed the water which entered or issued from the canal. A multitude of fishermen on its borders were engaged in catching and curing the fish which bred and multiplied in the lake, while the royalty on the fisheries averaged \$250,000 (£50,000). Its waters escaped along the hill above Memphis. About the middle of the deepest part was an island. On it were two pyramids and a tomb. Against the structures were two figures, seated upon thrones. The height of the pyramids equalled the maximum depth of the lake.

The *Lacus Meridis* of the Ptolemaic maps—the Raiyān Moeris—is confined to the Raiyān depression, with an extension into the narrow valley of Muellah. The term Raiyān retains the name of the monarch honored by Islam, associated locally with the spring in the southernmost bay of the depression, and closely connected by derivation with the idea of irrigation. Moeris, of course, is, like the Latin word *mare*, or the English “mere,” the exact equivalent of lake.

THE RAIYĀN PROJECT.

The whole subject of Egyptian irrigation has been treated with conspicuous thoroughness and ability by Mr. W. Willcocks, of the Indian Public Works Department, and one of the four Inspectors of Irrigation, who, under Col. Sir C. C. Scott-Moncrieff, Under-Secretary of State for Public Works, and Lieut.-Col. Ross, Inspector-General of Irrigation, succeed the Hyksos, Persian, Greek and French in foreign control of the native engineers. His book embodies the information collected during four and a half years of the irrigation systems of Egypt, and a *résumé* of the works carried out by Sir C. C. Scott-Moncrieff. The literature of irrigation, in general, is singularly scanty. Scarce a dozen titles can be found in the catalogue of any library. The volumes published by the State of California will soon be supplemented by those to be issued from the State Department in Washington. Mr. Willcocks provides a treatise which discusses systems of irrigation practised with eminent success for 4,000 years. It is curious to read how steel may now be introduced with advantage in the sluice-gates of canals for which the Sphinx was sculptured as warder.

One of its eleven chapters, one-twelfth of the entire contents of the book, is devoted to the Raiyān project. The whole volume is replete with information and will be found to be of the greatest value for all who are engaged in land reclamation schemes in countries where the rain-fall is insignificant. Extensive citations from this book have an obvious advantage. They are free from suspicion of exaggeration. They present prolonged and recondite researches reduced to logical sequence and

coherent form by a practical engineer, who contemplates that he may himself be intrusted with the execution of the works he recommends, and required to earn the interest which he promises on the capital which he estimates as sufficient. Mr. Willcocks appears to urge that summer irrigation impoverishes the land, and that basin irrigation, or an annual crop from flooded land is, in the long run, more productive. He has, however, explained that he objects to perennial irrigation when unaccompanied by those periodical floodings, in which the rich red waters of the Nile deposit the detritus of the Abyssinian mountains, mingled with the decaying vegetable matter transported by the White Nile from the swamps and marshes of Equatorial Africa.

Colonel Ross, in his admirable preface (p. xv.), shows the difficulty of draining Middle Egypt, especially the tract alongside of the Ibrahimiyyah Canal, or, in other words, by the side of the railway between Beni-Suef and Assiūt. The Nile flood absolutely bars drainage into the Nile; the Raiyān basin offers the ultimate solution of this problem. In future years—he says—after the Wadi Raiyān canal has been opened, and the summer supply of the Delta assured, the money now spent in raising water to irrigate can be spent in draining the extensive northern swamps; the irrigation water being delivered free-flow.

It is simply incredible that strenuous efforts are continually made under the direction of the Great Powers, who represent civilized Europe, to destroy the navigation of the Nile. Artificial obstacles are placed across the canals, and all the mouths of the Nile barricaded as soon as a low stage of the water is reached. The

financiers, protected by British bayonets, force transportation out of its natural channels on to the railways, or delay it for twenty-four hours at a bridge, for the more convenient collection of tolls, whose character has been stated with entire frankness in the official utterances of Sir H. Drummond Wolff and Sir J. Fergusson. The benefits of the Raiyān scheme include improved internal water communication.

Colonel Ross gives an analysis of the chapter which treats of "the recently developed project of the Wadi Raiyān." "The storage of water in this sister depression to the Fayoum will remove many difficulties about summer supply. The principal difficulty is to get the capital, either by borrowing, or forming a company to furnish the water in exchange for some concessions. Considering that it now costs £60,000 (\$300,000) to pump five million cubic metres (say 1,250 million gallons) of water into the Behera province, it does not seem a bad bargain to borrow a million and three-quarters (\$8,750,000) to furnish twenty million cubic metres of water daily (*ca.* 8,000 cubic feet per second) and even more, *i. e.*, to pay £87,500 (\$437,500) a year at five per cent. interest." As Colonel Ross points out, Egypt could borrow the necessary funds at five per cent. In other words the Raiyān project is considered by him an absolutely safe investment.

Two propositions were submitted to the British officials in Egypt.

First. Having placed unreservedly at their disposal all the information I had acquired, and having submitted to the fantastic, and, in my judgment, cruel and extortionate demands upon my life, health and private resources

in doing their work, in months spent in the desert with their engineers, or in putting my knowledge in a form in which it would influence the scientific, political and financial world and smooth their path, I offered to efface myself and leave them untrammelled in the execution of the work and the appropriation of the merit.

No remuneration of any kind, direct or indirect, was to be given me. It was to be considered sufficient if I were allowed to escape scot-free, without the *peine forte et dure*, which in Goethe's opinion, and my own experience, are still ready to invest with picturesque accidents the most judicious efforts to ameliorate the human lot or add to its intellectual wealth.

Second. When it was insisted that the gift to Egypt was incomplete unless the canal itself was finished without risk or cost to the bondholders or the taxpayers, and a net surplus paid into the Egyptian treasury, it seemed, again, that this was no function of mine, or necessary part of my work. The scientific examination of the Moeris problem required but a single visit to the untrodden summit of the Haram Medhūret el-Berhl, while any engineer could be invited and paid to spend thirty days in running lines of levels through the Haret el-Gehenna, whose name is well deserved. So also the Great Powers have furnished their ward with a financial staff, whose experience ranges from St. Petersburg to Calcutta. It was no business of mine to obtain the opinion of Lord Rothchild, the Council of Foreign Bondholders, the Imperial Ottoman Bank, or Sir J. Lubbock.

Two offers were nevertheless submitted. The first left to that bureau in the Department of Works specially created and charged with the expenditure of a mil-

lion of pounds, guaranteed by the Great Powers, all the engineering work. My confidence and that of the Egyptian Government in the skill and energy of Colonel Western and his staff was so complete, that there was little difficulty in obtaining authority from capitalists to provide the government with funds as the work advanced, secured upon the works themselves, with such participation in the benefits as might be determined. A scale was suggested.

The second offer simply accepted the estimates of the Egyptian Government and contracted to complete the work on their terms. We would agree to deliver the Raiyān Canal and flood-gates, according to specifications, for an annual payment not exceeding £50,000 (\$250,000), purchasable for a lump sum of £1,000,000 (\$5,000,000). The annual rent was in no case to exceed 70 per cent. of the net profits obtained by the government. These offers have not so much been rejected, as their final consideration postponed. They have been repeated and defined in the "Note on the Raiyān Project" submitted to the Department of Public Works in April, 1889. There is very little doubt, however, that the Egyptian Government, having expended another year in striving to find some other way of accomplishing the result, will borrow the money, guarantee the interest and itself do the work.

Considering its importance and the acknowledged benefits which will be immediately conferred upon Egypt, and, through the Valley of the Nile on the Equatorial Provinces, which have been transferred to the Mahdists, since the British occupation, as the result of the military and civil operations conducted by Hicks,

Gordon, Wolseley and Stanley, advised by Sir E. Baring, no personal interest should be allowed to intervene. What, in comparison with such results, is the naked assertion of the abstract right to bring to maturity a project, although the inception is admittedly the offspring of one's brain and heart, whose infancy required sedulous care, and the infant, destined to be a Hercules, was cradled in a shield and defended by the sword?

There are four possible channels by which the Raiyān Basin can be put in communication with the river. Two only are considered by Mr. Willcocks. The Abu-Hamed route involves a contoured canal in the desert along the southern edge of the Fayoum. It was regarded by Colonel Western as in all respects feasible at a moderate cost. Whether a shorter line, through the limestone hill, would, on the whole, be preferable is not, for the moment, essential. The former line fixes a maximum cost which can be used in working out the other elements of the project.

The only alternative scheme for the impounding of the surplus flood is that associated with the name of M. de la Motte. He proposes to build a dam across the Nile at Gebel Silsileh, 85 kilometres (50 miles) below Assuan (the first cataract) and make a reservoir in the desert plain of Kom Umbos. "This scheme is in a very embryo stage, and needs very much more working up to bring it to the complete and perfect state of the Wady Raiyān project, but it is roughly calculated to cost £4,000,000 (\$20,000,000)" (p. 322.). Its great weakness lies in the dam 60 feet high founded on a not very homogeneous sandstone. Other objections include the detention and deposit of silt, with the consequent

raising of the bed of the reservoir, and annual diminution of its capacity.

The summary of the Raiyān Project, as given by Mr. Willcocks, is substantially in the following words; the parentheses are mine:

The cultivated area of Egypt is 4,955,000 acres, and the land capable of reclamation in Lower Egypt, (exclusive of over 1,000,000 acres contained in the areas now abandoned to the Mediterranean, and forming the brackish lakes bordering upon it, together with at least 500,000 acres elsewhere) is 1,260,000 acres. If one-third of the cultivated land and the whole of the land to be reclaimed were to be irrigated in summer, there would be required a summer supply of

$$\left(\frac{4,955,000}{3} \times 26 \right) + (1,260,000 \times 40) = 93,000,000$$

cubic metres per day, of which the lands to be reclaimed would alone require 50,000,000 cubic metres per day. The mean summer discharge of the Nile is 42,000,000 cubic metres per day (16,800 c. f. per second) at Assūan, while there are years when it falls to 24,000,000 cubic metres per day, and hence the impossibility of doing any reclamation by summer cultivation on a large scale without storing water somewhere. The best known scheme before the public is that of Mr. Cope Whitehouse for storing water in a reservoir to the south-west of the Fayoum. This reservoir would be fed by a canal from the Nile in flood, and discharge back into the Nile in summer. The time during which the reservoir would be drawn upon would be from the 15th of April to the 25th of July, when the Nile is at its lowest. The elements of the problem, therefore, are the following:

First. A *basin* of sufficient magnitude to receive the Nile in flood ; and of sufficient area to yield between the flood-surface of the intake, and the low-water mark of the outflow, all the additional water required during the hundred days of insufficient Nile.

Second. A *canal* capable of passing a certain quantity of water into the basin. If the section of this canal is only large enough to discharge the daily supply required from the basin, (when filled and used as a reservoir) it will take a considerable number of years to raise the water surface in the depression to the level of low Nile, as the bottom of the depression is over 200 feet below the level of cultivated land in the Nile valley, on the same parallel. If the canal is of large section, it would fill the reservoir in three years, and could be used as an escape in time of dangerous flood.

Third. The determination of the *water-surface levels* of the Nile, maximum, minimum and mean, during flood and summer, with the discharges corresponding to the different levels.

Fourth. The determination of the *minimum level of the Nile in flood*, below which it must not be allowed to fall. In other words, the quantity of water which could be delivered at the Raiyān Escape without prejudice to existing interests.

Fifth. The *Raiyān works to the west of the Nile Valley*, excavations, earth-works, pitching ; and masonry works needed for regulation.

Sixth. The *works in the Nile Valley* needed for the passage of existing canals, drains, and the railway, by the large flood canal or escape.

Seventh. The *time* required to fill the reservoir: the quantity of water utilized after loss by evaporation and absorption has been eliminated.

Eighth. The *quality* of the water stored.

Ninth. The *effect* of reservoir water on the Nile water in summer in respect to the health of the towns depending for their water supply on the Nile.

Tenth. The *passage of the water* from the reservoir in summer through the existing canals in Lower Egypt, on the top of the ordinary summer supply, in order to reach the lands near the sea.

Eleventh. The *preparation of the lands to be reclaimed* so that the water may be utilized when it is obtainable.

Twelfth. The *cost*, capital required and means of earning interest on the capital.

“Granting the great advantages to be reaped from an increase to the summer irrigation of Egypt, and the necessity of this increase if the resources of the country are to be fully developed, there is no scheme more likely to attain this end than Mr. Cope Whitehouse’s project for a reservoir in the Wadi Raiyān, South-west of the Fayoum. At no other place in Egypt can a reservoir be obtained without first building a dam across the Nile.” Plate two gives a plan of the reservoir and the adjacent valley of the Nile, reproduced from Mr. Willcocks’ work, without any modifications; which, nevertheless, especially in nomenclature, might have advantageously been made. “This plan was reduced from the (latest) original plan, prepared by a staff of engineers working under the orders of Colonel Western, Director-

General of Works. The Ministry of Public Works is examining the project in a very thorough manner; Colonel Ross, Inspector-General of Irrigation, examining the irrigation side of the question, and Colonel Western the constructive."

"Given the reservoir, the section of the canal, the water level in the Nile, and the other factors in the problem, it is a question of permutations and combinations as to which is the best method of carrying out the project. A small canal will cost little; but it will take many years to fill the lake, the interest charges will run up, and the water of the lake will possibly (?) become brackish. A large canal will cost much; but it will soon fill the lake, the interest charges will not mount up, and the water of the lake will possibly not be brackish. A large canal will also be of use in reducing appreciably the water level of the Nile during a very high flood. A very high flood comes seldom, but a breach of the Nile banks in flood is the greatest calamity which can overtake the country; and any scheme which promises relief to the country in flood deserves careful consideration."

With these preliminary remarks Mr. Willcocks proceeds to consider the twelve elements of the problem, as he conceives it, in detail. The parentheses here also contain explanatory remarks by the author of this paper.

FIRST. *The size of the reservoir.* This is a fixed quantity. In Colonel Western's office, the large scale plan has been contoured and the areas covered by the different contours have been measured by a planimetre. The following table (abridged) contains this information.

AREA AND CUBIC CONTENTS OF THE RAIYĀN RESERVOIR.

R. L. of Contour.	Area in Square Metres.	Area in Egyptian Acres.	Contents of Reservoir in Cubic Metres, below the Contour.
30	686,600,000	163,475	20,559,640,000
25	618,300,000	147,214	17,297,390,000
20	550,000,000	130,952	14,376,640,000
10	397,904,000	94,739	9,637,120,000
Sea level.	301,100,000	71,690	6,142,100,000
—10	231,800,000	55,190	3,477,600,000
—20	163,075,000	38,127	1,503,225,000
—30	55,562,500	13,229	410,037,500
—40	22,037,500	5,247	22,037,500

The maximum flood level of the Nile at the (proposed) take-off of the reservoir canal is Reduced Level + 31.8 metres (about 100 feet above the Mediterranean), the ordinary high flood level is R. L. + 30.3, the low flood level is 29.0 metres, and the summer level is about 22.0 metres above mean sea. These levels are referred to the Barrage zero, or mean Red Sea, .60 metre above mean Mediterranean Sea.

Colonel Western thus describes the Wadi Raiyān : " This valley, a depression in the Libyan Desert, discovered by Mr. Cope Whitehouse in 1886 (this date being taken as the first official communication to the Department of Works of a survey verified by lines of levels, as distinguished from aneroid observations), lies immediately to the south-west of the Fayoum province, but separated from it by a range of low hills, averaging some 6 kilometres ($3\frac{1}{3}$ miles) in width, and with heights of about 60 metres (196 feet) above sea level. Two passes, however, leading from the Garak (the Rharaq of Schweinfurth, the Gharaq of the author's maps) basin of the Fayoum, with levels of about + 26 metres, have been found in this dividing range, and, except for these two passes or entrances, the Wady is everywhere



bounded by hills of at least + 36 metres above mean sea."

"The soil of the Wady is for the most part composed of desert sand and pebbles, overlying in places a yellow clay, but this desert sand is for about one-sixth of the area hidden by drifted sand-hills, or ridges rising some 5 to 10 metres above the general plain. Towards the north of the Wady, there are two fresh water springs (but no inhabitants) and near there, a few date trees and some brushwood grow. The deepest level of the Wady Raiyān reaches 40 metres below sea level (about 220 feet below high Nile). To the south of the Wady and connected with it at a level of + 55 metres is the Wady Muellah, a valley about $1\frac{1}{2}$ kilometres width and seven length. Its lowest depression is + 25 metres (about 35 feet below mean high Nile near Behnesa, opposite its southern extremity). In the Wady Muellah there are ruins of ancient buildings (with fragments of a Greco-Roman period, further identifying the spot as the Dionysias of the Ptolemaic text and map). There is a fair amount of coarse vegetation near them."

"Two other small depressions have been found, connected with the Wady Raiyān at its north-eastern extremity at a contour lower than the level of the flood Nile. They lie to the south of the Gharaq basin of the Fayoum province and are separated from it by a ridge with a level of + 35 metres, one kilometre in width. The easterly depression (the Wadi Lulu, or Valley of the Pearl, a modern name given to it by the author of this paper) is about 10 kilometres in length by 4 kilometres mean width and has a bottom at about + 15 metres."

SECOND. *The Reservoir Canal.* "Referring to the

plan," says Mr. Willcocks, "it will be seen that Biba is the point chosen for the take-off of the canal from the Nile. It is 163 kilometres above the Barrage along the deep channel of the Nile (85 miles south of Cairo by rail). Of course any other point near it may be chosen, but considering the lie of the basins and their feeders, it will be difficult to choose a better place. On the plan there are two lines given for the canal; one is called the 'Proposed Reservoir Canal' and has been (repeatedly) levelled and surveyed, (examined by Colonel Western in person, and pits sunk to test the character of the material to be excavated). The other is called the 'Alternative line.' All calculations have been made on the former. If the surveyors can find a fairly good line along the latter, it will be decidedly the better line, as it makes straight for the reservoir and avoids the banking up in the Fayoum Valley necessary on the former line."

Neither line presents the smallest engineering difficulty, or would be above the capacity of a native provincial chief-engineer. The direct line involves a tunnel about five miles in length through horizontal limestone. With a bed width of 80 metres, and a height of 10 metres, it would be more convenient to drift a series of openings. Undoubtedly this would be the channel selected if the Irrigation Department was directed, as in the days of Raiyān ibn el-Walid, the Hyksos monarch, who, according to Semitic tradition, proposed to Jūsuf ibn-Jacoub the problem of regulating the Nile, or when Ipsambūl and the Sphinx were carved in the living rock, and the hills opposite Memphis emptied of incalculable masses of stone.

The splendid effect of the façade with the stream, 250 feet in width, gushing clear and blue from the white portal, between colossi carved with the least expenditure of labor, but the most ingenious adaptation of natural conditions in the stratified rock, would not now have the slightest weight with the Department of Public Works and their financial masters. The passage itself, its forest of columns, the Cathedral-Mosque of Cordova extending miles in length, the vast air shafts, 200 feet in height, corbelled out in mouldings decorated with sentences from the Qurán, telling in words that history of Jūsuf written in water, fruits, flowers, fields and houses, temples and mosques along the River of Joseph and in 'the land of a thousand days' will not be attempted. Such considerations are absolutely alien to the actual administration as controlled by foreign influences.

It would be otherwise if the Viceroy, whose devotion to art and science has been tangibly exhibited, were free to apply the surplus of enlarged revenues according to his better judgment.

"The (total) length of the proposed canal is 46 kilometres (27 miles) from Biba to the point A, in the reservoir. The length of the alternative line is about 30 kilometres (18 miles). The slope of the canal will be $\frac{1}{1000}$, the ordinary canal slope in Egypt. This slope, with a hydraulic mean depth of between six and seven metres (20 feet) will give a mean velocity of about one metre per second ($2\frac{1}{2}$ miles an hour), a velocity which allows neither silt deposit nor scour in the Nile Valley."

THIRD. *Flood and Summer Levels of the Nile at*

Biba. As a rule there is such a heavy demand for water during the month of August, that in any but a very exceptional year no water (in Mr. Willcocks' opinion) can be taken from the river, and this month must be left out of the calculations.

DISCHARGE OF THE NILE AT CAIRO.

Month.	Mean discharge in cubic metres per 24 hours.	Feet per second.
January	151,000,000	60,400
February	110,000,000	44,000
March	70,000,000	28,000
April	45,000,000	18,000
May	34,000,000	13,600
June	34,000,000	13,000
July	70,000,000	28,000
August	525,000,000	210,000
September	675,000,000	270,000
October	675,000,000	270,000
November	400,000,000	160,000
December	260,000,000	104,000

The maximum flood of 1874 discharged 1.032 million cubic metres in a single day; the minimum flood of 1877 discharged 465 million cubic metres, or less than one-half that amount.

Mr. Willcocks puts the entire discharge of the Nile during the year at 93,000 million cubic metres. If 3,000 million cubic metres are required for the basins of Upper Egypt, and 50 million c. m. were furnished for daily consumption there could never be a year in which 50,000 million c. m., or double the contents of the Raiyān Reservoir, would not pass into the Mediterranean without contributing in the least degree to the fertility of Egypt. The regulation of the Nile at the Barrage in July and part of August would put a certain volume of

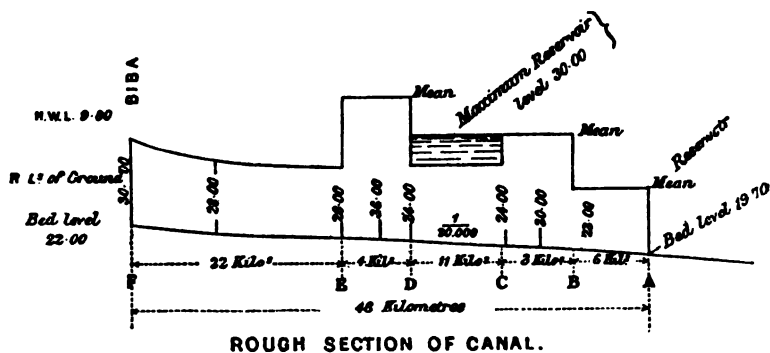
water at the disposal of the government for the Raiyān basin. The summer, or low Nile, level at Biba may be taken as 22.00 metres.

FOURTH. *Levels at which the Nile must be maintained for flood irrigation.* In September a gauge of 16.3 should be generally maintained at the Barrage, though alternate week gauges of 16.3 metres and 15.8 metres (above zero) would suffice for the irrigation until the 10th October. From the 10th to the 20th October, a gauge of 17.0 metres is needed at the Barrage to allow all the high lands to be irrigated for the winter crop. After the 20th October, the canal might take as much as it liked from the Nile, or from the basins above it, except in extraordinarily low years like 1888.

In an average year, from the 1st of September there is available a discharge of 57,500,000 cubic metres per day, increasing to over 100,000,000 on the 15th September. Between the 10th and 20th October, no supply is available, as the Nile berms have to be irrigated, while after the 20th October, the canal can take as much as it can carry. It is better (in Mr. Willcocks' opinion), to depend on an alternate week supply in low years than on any regulation at the Barrage, because the former meets the requirements of Upper Egypt, north of the canal, as well as those of Lower Egypt, while the latter meet the requirements of Lower Egypt alone. A fluctuating supply in the Nile in a high year like 1887, would bring down the Nile banks, but in high years this alternate weekly supply will not be necessary. In the low Nile years, when it is necessary, no harm will be done by a difference of half a metre, which this system of filling will entail.

As far as a high Nile flood is concerned, a canal incapable of carrying 100 million cubic metres per day at the high flood gauges, would be of little use. A difference of 50 centimetres at the Barrage gauge when the readings are between 18 and 19 metres means a daily discharge of that amount. Taking high flood relief as the most important factor in the calculation (of the size of the proposed canal) and the level of the bed of the canal at 22 metres at the take-off, the canal should discharge 100 million c. m. per day with a depth of water of 9.8 metres. A canal with a bed width of 80 metres (250 feet) and side slopes of $\frac{1}{2}$ will accomplish this result.

The following is a rough longitudinal section of the proposed canal.



LONGITUDINAL SECTION OF CANAL.

The earthwork estimate is as follows :

From F to E : Length, 22,000 metres ; mean depth, 6.5 metres. Contents, 12,370,000 cubic metres. This is capable of reduction by following the Bahr Jūsuf in places.

E to D.—Length, 4,000 metres ; mean depth, 15 metres. This section is a soft limestone cutting (to the depth of about a metre, resting upon a very compact clay, impregnated with salt, and dissolving with extreme facility into fine mud), and here the bed may be lowered 4 metres, as recommended by Colonel Western, and the depth of water becomes 13.3 metres. The bed width here may be reduced to

40 metres, which will give such a slight afflux that it will not be felt within 10 kilometres of the head. The material to be removed is 4,484,000 cubic metres.

D to C.—Length, 11 kilometres. The hill (along the southern edge of the Gharaq basin of the Fayoum slopes gently from + 60 m. to + 14 m.), and the canal can follow any contour decided upon (and the required section thus obtained either by a deeper excavation or a higher bank on the lower side—the only one required—as may be considered expedient and economical). If a contour of + 24 metres is chosen (and the bank given a top width of 15 metres), a sectional area for the embankment of 200 square metres will cover all contingencies. The breadth of section, (varying with the irregular edge of the desert, and reaching in some places a width of 1,500 metres, or over a mile), will make up for any loss in depth: material to be handled; 2,200,000 cubic metres.

" C to B.—Length, 3 kilometres, depth, 14 metres, and (bed) width, 40 metres, since this is in part another soft limestone ridge (with pebbles, desert sand and clay): material; 2,352,000 cubic metres.

" B to A.—Length, 6,000 metres, depth, 3 metres: 1,500,000 cubic metres.

The estimated cost of work is:

Section F to E.—12,370,000 cubic metres at £.04 (20c.)=	£494,800=(\$2,474,000).
" E to D.— 4,484,000 " " " .10 (50c.)=	448,400=(\$2,242,000).
" D to C.— 2,200,000 " " " .04 (20c.)=	88,000= (\$440,000).
" C to B.— 2,352,000 " " " .10 (50c.)=	235,200=(\$1,176,000).
" B to A.— 1,500,000 " " " .04 (20c.)=	60,000= (\$300,000).
Total 22,906,000 " " " £.58 (29c.)=	£1,326,400=(\$6,632,000).

FIFTH and SIXTH. *Masonry Works.* The masonry works are needed for regulation, and for the accommodation of existing works.

1. *The Bahr Jūsuf Crossing and Reservoir Regulator.* This can be built on the limestone rock with a 40 metre wide platform, and a 2.5 metre depth of masonry, the levels of the canals will allow of a level crossing.

40' openings	at £1,500 — £60,000 — \$300,000
Wing walls	10,000 — \$50,000
2,000 square metres regulating gates	at £9. — 18,000 — \$90,000
Total	£88,000 — \$440,000

2. *The Sugar Railway* will be diverted to the government railway bridge at a cost of £20,000 (\$100,000).

3. *The Ibrahimia Canal* will be syphoned under the reservoir canal. The discharge to be passed is 3,000,000 cubic metres per day, and allowing a head and velocity of 2 metres per second, 8 pipes of 1.5 metres diameter will take the water across.

Estimate 8 pipes.....at £3,000 = £24,000 (\$120,000), 300 tons + masonry.

4. *The Government Railway.* 4 feet 8½ inch gauge, 80 metres wide canal. Tons of iron, 1,500 at £25.; £37,000 (\$185,000). With the work can be combined the regulating head of the reservoir canal, eighteen openings of 5 metres at £2,500 (\$12,500)=£45,000 (\$225,000).

Railway Bridge.....	£37,500	(\$187,500)
Regulator.....	£45,000	(\$225,000)
	<hr/>	<hr/>
Total	£82,500	(\$412,500)

The masonry works therefore, will amount to

Bahr Jūsuf Crossing and Regulator.....	£ 88,000	(\$440,000)
Sugar Railway Diversion.....	20,000	(\$100,000)
Ibrahimia Canal Syphon.....	24,000	(\$120,000)
Head Regulator and Railway Bridge...	82,500	(\$412,500)
	<hr/>	<hr/>
Total	£214,500	(\$1,072,500)

The whole of the earthwork and masonry works will therefore (according to Mr. Willcocks) amount to

Earthwork.....	£ 1,326,500	(\$6,632,500)
Masonry.....	214,500	(\$1,072,500)
Land, 1,600 acres at £30 (\$150.).....	48,000	(\$ 240,000)
	<hr/>	<hr/>
Total	£1,589,000	(\$7,945,000)

It will be a matter of interest to all those concerned in irrigation works to study these estimates, but no American engineer would, for a moment, admit that they furnish a basis upon which contracts could be let to the advantage of the government. The difference

between the method of constructing American and Indian railways is exhibited in the excessive allowances for work which could never be required.

Mr. Willcocks is not only an engineer of great ability and indefatigable energy, but deservedly enjoys the reputation of a readiness to adapt his plans to circumstances, in a manner characteristic rather of the United States than of Great Britain. His field work would be very different from his plans on paper. Availing himself of the tremendous velocity obtainable through the Lulu and Safir basins and the rapid slope of over 150 feet into the Raiyān depression much of the excavation would be accomplished by natural forces.

The Raiyān Works proper commence at the Bahr Jūsuf, and the western (desert) edge of the Nile Valley. Former estimates of £500,000 (\$2,500,000) would not be exceeded. The great canal across the Nile Valley from Biba would in reality be a broad shallow basin cultivable once a year throughout its entire area. The masonry works may be taken as reasonable, but a part of the money would be otherwise expended. The total cost, therefore, of the Raiyān Project should be estimated thus:

Raiyān Canal of Escape, and Supply.....	\$2,500,000
Works in the Nile Valley.....	1,500,000
Total, (£800,000)	\$4,000,000

SEVENTH. *Quantity of Water capable of being utilized (without pumping). Time of filling Reservoir.* It appears (from Mr. Willcocks' tables) that for forty days each flood a depth of water of 8 metres (25 feet) may be taken into the canal, for twenty days the basins above the canal may be discharged into the canal

through the Bahr Jūsuf, for the thirty days of November a depth of 6 metres of water may be counted on, for December a mean depth of 4.5 metres, for January a depth of 3.0 metres, and for February of 2 metres. With an 80-metre wide canal, slope $\frac{1}{20,000}$, the (daily) discharges are :

8.0 metres depth.....	67,000,000
6.0 " "	42,000,000
4.5 " "	25,000,000
3.0 " "	13,000,000
2.0 " "	6,000,000

Therefore the supply obtained per annum would be :

September and October.....	60 × 67,000,000 = 4,020,000,000	cubic metres.
November.....	30 × 42,000,000 = 1,260,000,000	" "
December.....	30 × 25,000,000 = 750,000,000	" "
January.....	30 × 13,000,000 = 390,000,000	" "
February.....	30 × 6,000,000 = 180,000,000	" "
March, from Bahr Jūsuf.....	30 × 5,000,000 = 150,000,000	" "
Per annum, 6,750,000,000		" "

Referring to the table of contents of the Raiyān depression, and allowing for evaporation and absorption, it appears that :

	Metres above sea.	Contents cubic metres.
At the end of the first year the water in the lake would rise to	+ 2 =	6,750,000,000
" " second " " " "	+ 17 =	12,892,100,000
" " third " " " "	+ 27 =	18,566,760,000

In other words, the lake would be filled to the level +27 metres (above sea), or about 5 metres (16 feet) above low Nile at the end of the third year. It could give a half supply that year. The fourth year the lake would be in full working order and could be filled to +28 metres. Allowing 1 metre as loss by evaporation from April 1st to July 31st (an excessive estimate), the water in the reservoir could be utilized (without pump-

ing, either to fill or empty,) to the depth of 2 metres, *i. e.*, a stratum of water of 1,263,920,000 cubic metres, or a discharge of 12,639,200 c.m. per day (about 3,000 million gallons for 100 days.) This amount would flow back into the (Nile) canal through the reservoir canal as levels would suit. There are years when the lake could be filled to R. L. 29.0 or R. L. 30.0, but above R. L. +28 could not ordinarily be counted on.

It is obvious that Mr. Willcocks does not mean to limit the available portion of the 20,000 million cubic metres stored in the Raiyān Reservoir to little more than one-tenth. The water is to be consumed at all levels above the Mediterranean on its way to Alexandria, Port Said or Suez, and even slightly below the level of the sea on the bed of Lake Abūkir. A straight, clear channel past the pyramids, connecting with the Alexandrian canals, would lower the lake another 5 metres without artificial means.

EIGHTH AND NINTH. *The Quality of the Water, and its effect on the summer water of the Nile.* Mr. Willcocks quotes at length from the report of a meeting of the Khedivial Geographical Society, March 16th, 1888, in which this and kindred points were fully discussed.

Pierre Bey, engineer-in-chief of the *Compagnie des Eaux du Caire*, inquired whether there was any danger of infiltration into the Fayoum. M. Lieurnur, engineer-in-chief of the expedition of 1888, responded, and pointed out that it was definitely settled that the two depressions are everywhere separated by broad and solid strata of rock, except at two narrow passes of inconsiderable width, and little below the level of high Nile. In answer to a second question, whether the lake

might lose a part of its contents by infiltration towards the Mediterranean, he said that as the Raiyān and Fayoum basins, although 40 metres below the sea, have no infiltration into them, such a risk could not be considered as within the range of possibility.

It may be added that the silt-charged waters of the Nile speedily fill interstices and thus canals and embankments puddle themselves.

Salem Pasha (the largest landed proprietor in the Gharaq district) desired to know whether the water might not be impregnated with salt. Mr. Cope Whitehouse replied that this subject had been attentively considered, and that the unanimous conclusion of the officials in the Irrigation Department, as well as the native chief-engineers, whom he had taken pains to consult, was in the negative. There is salt in the Raiyān basin as everywhere else in Egypt, on the tops of its hills and in the soil of its fields. A shallow lake would be brackish. The Birket el-Qerūn when low is quite brackish. It contains all the salt which has passed into the Fayoum for countless ages, from a pre-historic period, concentrated from a surface of 1,250 square miles into a comparatively small area with a depth of only 8 metres (25 feet). Whenever this lake has attained a greater depth the upper stratum has become quite fresh, as evidenced by the remains of shell-fish. Even now the upper stratum can be used to drink; he had often so used it for several days at a time. The bed of the Raiyān basin contains in certain places small saline deposits. The pools formed in the lowest parts would be brackish until they had attained a certain depth. When the lake had been filled to a depth of,

say, 20 metres, the water would be quite fresh. The large quantity added and withdrawn each year would also tend to change the whole volume, while any percentage of salt absorbed would be infinitesimal, and of no possible importance in relation to either agriculture or its use in drinking.

Dr. Schweinfurth was inclined to think that the Raiyān depression could be more advantageously treated like the Fayoum, and used as an additional cultivated area. He repeated the fear that the water might become salt.

Mr. Cope Whitehouse said, in reply, that the difference between 80,000 (Egyptian) acres, cultivated once a year, and (not less than) 2,300,000 acres of *sefi* (summer) cultivation was in itself a reason why the reservoir scheme must be considered preferable, if feasible. In any event there is no risk incurred. Long before any part of the water which had been poured into the Raiyān basin could be discharged again into the Nile, the problem would have received a practical and final solution. If the water proved unfit for use, the canal would nevertheless have paid for itself as a flood escape, and as an irrigation canal for the Raiyān district. He might also say that if the Raiyān basin was the Lake Moeris of the Ptolemaic maps, we have the experience of 2,000 years to put against a conjectured possibility. He would, however, ask the Inspector-General of Irrigation for his opinion.

Major (now Lieut.-Colonel) Ross—who was received with warm applause—said that he entertained no apprehensions in regard to the purity of the waters and explained his reasons at length.

He wished to add in respect to the amount of land

which could be cultivated by this reservoir that Mr. Cope Whitehouse had confined himself to the Delta. If twenty million cubic metres of water, per diem, could be added to the summer supply, it would enable the Department of Public Works to increase the amount now allotted to the cultivation of Upper Egypt. There is also a large area in the plain near Kom Ombos, which, by the scheme recommended by Mr. de la Motte, would be converted into a storage reservoir. It is excellent land and can be easily irrigated. *Sefi* cultivation might be largely extended in the provinces of Minieh and Beni-Suef. Cultivation in the Fayoum could also be increased. The Government would not be obliged to economize its water supply in Upper Egypt, because the Delta would obtain a part of its normal, as well as an additional, supply from the Raiyān reservoir. Another ten million cubic metres of daily supply would also go far to put a stop to corruption in the Delta. The strain upon the honesty of the local officials, when offered a bribe for a few hours' more water, is very great, and sometimes irresistible.

Mr. Lieurnur confirmed what had been said by Major Ross in regard to salt. In accordance with his instructions he had sunk experimental wells all over the basin, and had not found salt except in insignificant quantity. The bottom of the basin is rock, covered with clay and drifted sand hills.

On this point it may be added that it is much to be regretted that Dr. Schweinfurth should have given expression to a doubt on this subject. The question was subsequently examined by Osman Bey Ghalib and Dr. Seckenberger, and they agree with Colonel Ross

and all other experts. No project has probably ever met with such universal favor as this Raiyān scheme. Thousands of engineers, American, Egyptian, English, French and German have had an opportunity of studying it. The most eminent men have urged its immediate execution. Objections of a somewhat similar character, transmitted through Sir E. Baring—British Agent and Consul-General—to the Foreign Office, have contributed materially to delay the actual completion of the work. "The purpose of the government," says Herodotus, "in constructing this reservoir was to supply (good) Nile water to the inhabitants of the towns not lying upon the (main branches of) the river; for previously they had been obliged after the subsidence of the flood (as at present) to drink a brackish water which they obtained from the wells."

TENTH. *Passage of the Raiyān Water Through the Canals of Lower Egypt.* The canals taking off from above the Barrage will be capable of utilizing the following discharges at R. L. 14 metres on the Barrage, which is the maximum gauge to which water is to be held up in summer:

	Cubic metres.
Behêra.....	8,000,000 per day
Menoufieh and Gharbieh	16,000,000 " "
Dakalia, Sharkia and Kalubia.	20,000,000
Total.....	44,000,000

Since the *mean* summer discharge of the Nile at Cairo is 34,000,000 cubic metres per day, and the reservoir can supply at least 12,000,000 per day in summer, the existing canals will (to that extent) suffice.

ELEVENTH. *The Lands to be Reclaimed near the Sea* will have to be provided with canals and drains. An

expenditure of £2 (\$10.00) per acre on the land to be reclaimed must be considered in all estimates of cost of reclamation, in addition to the water supply in summer. The winter supply will have to be provided against also in some of the provinces.

TWELFTH. *Cost of the Project and Time Required.* Mr. Willcocks estimates the cost at £1,589,000, *if everything has to be done thoroughly.* The canal will, he thinks, take three years to complete if machinery is freely employed; and the reservoir will take three years to fill.

Prime cost	£1,589,000	(\$7,945,000)
Interest at 5 per cent. for six years	476,000	(\$2,380,000)
<hr/>		
Total cost, including interest	£2,065,000	(\$10,328,000)

How can interest be calculated on the entire total cost for the three years in which the works are in progress? The interest the *first* year would not be £10,000, and the ordinary deferred payments to the contractors would still further effect material reduction.

The Manchester Ship-Canal has established a rate of excavation and earthwork which would enable a contractor of equal energy to open the canal of escape in a single year. It would immediately begin to earn the amount agreed upon as remuneration for this part of its duty. The small basin, the Lulu Reservoir, would be also available for storage, and a crop grown on the plateaux of the Raiyān depression wherever water lodged for over ten days.

The masonry works would not be required until the third year after the escape canal had been completed, and it would be inexpedient to undertake them until after the escape had been worked. Official estimates

are influenced by precisely the opposite calculations to those which induce the capitalist to add fifty per cent. to the figures of an ordinary project. The British Government desires to increase the Egyptian debt, without guaranteeing either principal or interest. It has been proposed to use the Raiyān project to influence the Great Powers. The liberty to borrow a large sum would be convenient. If the works were executed for half the estimates there would be so much more to the credit of the Irrigation Department.

Mr. Willcocks concedes that, by carefully selecting the site of the canal, and economizing in the hill slopes, the total cost (of the completed works) might be reduced to £1,800,000 (\$9,000,000). The annual interest charge would then be, at five per cent., £90,000 per annum. Nothing is said about maintenance charges, probably because he considers them too insignificant.

This undertaking appears (to him) so vast, and the difficulty of insuring a return so great that no private company, except a guaranteed one, could undertake it. "As far as Egypt is concerned, however," he says, "the completion of this reservoir would permit of a *new province being formed in the north of Egypt*, and give an impetus to the reclamation of the waste land which would in the end have a marked effect on the revenues of the country. With flush irrigation in summer assured land could easily pay ten shillings (\$2.50) per acre. With a canal of eighty metres in width a discharge of 12,000,000 cubic metres per day in summer can be guaranteed for £1,800,000 (\$9,000,000). The interest on £1,800,000 at five per cent. per annum is £90,000, (\$450,000) or £75 (\$375) per million cubic metres

(400 feet a second). Twelve million cubic metres per day would suffice for 300,000 acres of rice, or 400,000 acres of rice and cotton combined. To reclaim 400,000 acres, it would be necessary to spend £2 (\$10) per acre, or a capital of £800,000 (\$4,000,000). A company, therefore, which received the concession of the Raiyān reservoir and 400,000 acres of land in the Birriya (uncultivated Delta) would need a capital of £2,600,000 (\$13,000,000). If the undertaking were successful a net profit of fifteen per cent. might be obtained, but the company would always be at the mercy of the Government."

It seemed better to give the summary of the projected restoration of the Raiyān Moeris (as far as possible) in the words of Mr. Willcocks. Everything that he concedes in its favor is clearly to be accepted as the official admission of men of marked ability, enjoying every opportunity of arriving at correct results. In the opinion of the Hon. John Cardwell, late Consul-General of the United States, himself a warm sympathizer in my efforts, the project was reluctantly examined with the expectation and hope that it might easily be exposed as a delusion.

No capitalists, of course, would raise the money in the form contemplated by Mr. Willcocks. The money required for canals and drains in the Delta could be obtained from local enterprise. No guaranty would be required from the Government except an undertaking to allow water to flow in and out of the canal, at certain stages of the river, and to pay, at a fixed rate per million cubic metres, for the benefits thus conferred.

Sir C. C. Scott-Moncrieff is in this dilemma. If he

advises the Egyptian Government to solicit from the Great Powers the right to increase the indebtedness of Egypt, he pledges his position and reputation to the absolute certainty of the enterprise. He knows that every penny wrung from the peasant is a hardship, and that the power of Egypt to borrow at between four and five per cent. would be seriously strained by the unprofitable use of any such sum of money as £2,000,000. Taking only the absurdly small estimate of £6,000,000 (\$30,000,000) as the total cash value of the Raiyān Reservoir, Mr. Willcocks estimates my gift to Egypt at £4,000,000 (\$20,000,000); the actual value, of course, with skillful management, would approach £100,000,000 (\$500,000,000).

If, on the other hand, there is any risk, what is it? What is its value in terms of enhanced interest or prospective profits offered to the capitalist? Let Sir C. C. Scott-Moncrieff draw up the terms of a concession, or modify those already submitted. They embraced the alternative of lending the Government the necessary funds, without a guaranty, on participation in net earnings, or of completing the works in one-half the time, and at one-half the cost on which Mr. Willcocks would earn fifteen per cent. and Sir C. C. Scott-Moncrieff concedes ten per cent. It may be observed that no allowance is ever made for any remuneration to the discoverer, inventor, or advocate of the Raiyān project.

Vastness is no attribute of the engineering works detailed by Mr. Willcocks. The original scheme, including the conversion of the Fayoum into a fertile province, with its borders and approaches crowned with pyramids and a pyramid-hill where it was deepest, a canal—a river,

not a stagnant ditch—from Assiūt to Alexandria, fit channel for Indo-Mediterranean commerce, passing at the foot of Memphis, a throne of empire, was vast in every sense of the term. Some elements of the sublime might be thought to attach to the pursuit of the True, the Beautiful, and the Good—the defense of the dead from aspersion, and of the living from pestilence and famine. The removal of some millions of baskets of earth is literally child's work.

“In spite of much ridicule and some opposition,” writes Mr. Moberly Bell, “Mr. Cope Whitehouse has held to his project with all the tenacity of an enthusiast and has now the well-earned reward of seeing his scheme regarded as practicable and profitable by men whose judgments cannot lie under the suspicion of being influenced by the poetical enthusiasm of the student who originated them. It is probable that if he had appeared in Egypt as the mercenary would-be promoter of a simple commercial enterprise his views would from the first have received more serious consideration. It is, however, at least equally probable that they would not have achieved the same success. He may now be fairly congratulated on having proved the practicability of a scheme which was by many regarded as the dream of the visionary enthusiast.”

Sir Edgar Vincent, as Financial Adviser to the Khedive, in his memorandum on the subject (1888) said: “If, after the Barrage has been working for three or four years, it is found that an increased supply of water is required and can be dealt with, the scheme of Mr. Cope Whitehouse will become a valuable instrument for the agricultural development of Egypt. If it were possible to

make the scheme entirely self-supporting by granting Mr. Cope Whitehouse, for a term of years, certain barren lands which his reservoir would render cultivable, such a proposal would have my hearty support." He added with generous courtesy: "I cannot conclude this memorandum without expressing my high sense of the intelligence and perseverance with which Mr. Cope Whitehouse has pursued the realization of his object."

Sir Julian Pauncefote, as permanent Under-Secretary of State for Foreign Affairs, on January 12th, 1889, wrote: "With reference to my letter of the 13th of August last, and to previous correspondence respecting your scheme for the creation of a large reservoir in the Raiyān basin for the storage of Nile water for irrigation purposes, I am directed by the Marquis of Salisbury to inform you that Her Majesty's Agent and Consul-General at Cairo (Sir Evelyn Baring) has received a note from the Egyptian Minister for Foreign Affairs (Zulfikar Pasha) stating that the project has been carefully examined by the Egyptian Government, but that after full consideration they have come to the conclusion that they cannot adopt your proposals, while the benefits which might accrue from their adoption are fully acknowledged. I am to add that Her Majesty's Agent and Consul-General, while regretting that Egypt is not able to profit by the execution of the project which you have prepared with so much care and skill, states that he has satisfied himself that the project has been considered with the greatest care and attention by Sir C. C. Scott-Moncrieff and Colonel Ross, who, as you are aware, are the responsible advisers of the Khedivial Government in such matters."

The Raiyān project, then, is in "a complete and perfect state" (Willcocks, p. 322). The Khedive, as befits the ruler of Egypt, displays that disposition to further its execution, which his judgment, tact and practical acquaintance with the needs of his people approve. The native officials and the inhabitants co-operate. The British Government assumes all the responsibility for the delay, basing the attitude on the recommendations of its representative. Sir Evelyn Baring has authorized me to make public his personal recognition of the value of the work, and expression of regret that circumstances should not permit it to proceed as rapidly as seems to me desirable.

Lord Salisbury has given the subject some attention, but whether from recondite motives of profound policy, or influenced by the qualified, and in some respects erroneous, information laid before him, this most able of Foreign Secretaries has not allowed his hand to close upon the powerful weapon which has for some time been well within his reach.

Mr. Gladstone, with his keen love of Hellenic literature, has thrice sought occasion to offer words of encouragement and commendation. On both sides of the House of Commons, but especially from the Liberal side, assurances have been given that this question would never be treated as political.

The King of the Belgians early manifested a personal interest, expressed in terms which were flattering in the extreme.

The French Government, also, I am credibly informed, would further the project as tending to improve the state of Egypt, without regard to purely political considerations.

If, as Sir Samuel Baker points out in the *Fortnightly Review*, October, 1889, every river tributary to the Nile should be controlled by weirs, or dams of masonry, "the scheme for the restoration of Lake Moeris (in the Raiyān depression) as the great reservoir of the Nile, proposed by Mr. Cope Whitehouse for the security of Lower Egypt, would be accomplished as a natural result of engineering science, which had bridled the untrained jaws of Egypt's river, and guided its course to the service of mankind." A true Fountain of the Sun, it would bring Light and Life to the heart of Africa. It would once more challenge the admiration and esteem of the world for those who thought that by such great works they reared an imperishable memorial to attest the splendor of noble purpose when applied to guide and restrain the capricious hand of Nature for the health and wealth of the distressed inhabitants of the Valley of the Nile.

NOTE.—The author of this paper is not responsible for the spelling of the names in quotations, or on the maps and cuts reproduced.

GEOGRAPHICAL NOTES.

THE INTERNATIONAL GEOGRAPHICAL CONGRESS.—The International Geographical Congress met in Paris on the 5th of August, and closed its sittings on the evening of the 10th with a banquet. The opening address was made by M. de Lesseps, President of the Paris Geographical Society, and the different Sections then entered upon their work, which is fully reported, in the order of the classification adopted, by *La Géographie*.

In the Mathematical Section a communication was received from M. Lallemand, mining engineer, on the subject of a zero for altitudes in Europe. He showed that, according to the results of the new survey of France, the difference of level between the Mediterranean and the Ocean was but from 1 to 2 decimetres (.3281 to .6562 of a foot) instead of 1 metre (3.2809 feet) as previously supposed; and he thought it would be well to establish a mean level for each country before deciding upon a fundamental horizon. M. Lallemand dwelt also on the necessity of correcting the surveys operated in mountainous regions by taking into account the influence of the variations in gravity. M. Defforges pursued the subject with a detailed criticism of the methods and the instruments employed during the past century, and on his motion the Section adopted a programme of observations to be applied to the determination of variations in gravity resulting from elevation.

There were discussions on the observation of ocean currents and especially those of the North Atlantic, the advantages of the decimal division of time, and the proposition of Father Tondini, delegate of the Bolognese Academy of Sciences, for the adoption of the meridian of Jerusalem as the initial meridian for longitudes, as well as for the universal hour. This proposition, with which Father Tondini's name has long been identified, has received the support of many competent authorities, among others, of Dr. Supan. One argument in its favor is, that, Jerusalem being for Christians and Moham-medans as well as for Jews a holy city, the selection of that meridian would recommend itself to all mankind; unless, indeed, it were thought proper to include among men the inhabitants of Eastern Asia and some other parts.

It must be admitted that the choice of Jerusalem would put an end to national rivalry for the possession of the prime meridian, and France, at least, would find some compensation for giving up her own preference in the establishment, delicately suggested by the President of the Bolognese Academy, of an observatory on the "anti-meridian of Jerusalem" in Tahanea, one of the islands in the French Archipelago of Tuamotu. On the final question there were twelve votes for, and twelve votes against, Father Tondini's proposition, and this result probably settles the matter.

An ideally perfect meridian were an excellent thing, if it could be had, but most persons will agree with General Kaulbars that, while one meridian is intrinsically as good as another, that of Greenwich is to be preferred. Months, like meridians, are part of the machinery of

life, and it does not seem to distress the logical mind of Father Tondini that he is obliged to designate the tenth month of the year by the name of October.

In the Section of Physical Geography the Japanese delegate, Mr. Wada, read a paper on the organization of seismological research in Japan, M. de Saussure gave a sketch of what Switzerland was doing in the same line, and Baron von Schwerin presented a report on his explorations of the country at the mouth of the Congo and on the western coast of Africa. Through the whole extent of this region the sea is retreating and the land is rising; the rains are less and less frequent and the soil dries up and contracts, and there ensues a sinking in of the continental mass upon itself along the coast.

M. Turquan presented to the Section of Economical and Statistical Geography a work on the immigration of foreigners into France and the emigration of Frenchmen to foreign countries. Other works presented were: one by General Kaulbars on geographical achievement in Russia, and one on emigration by M. Metzger. With regard to the destruction of forests, the Section, speaking for the Congress, unanimously voted a resolution that shows a lack of faith in the unassisted efforts of kindly Nature. "The Congress, considering that the disappearance of woods from the surface of the soil produces and will produce consequences the most disastrous from every point of view, physical, economical and meteorological, expresses the hope that the nations, which still have the good fortune to possess the forest growth that protects the soil, will make every effort to preserve it, and that the others, whose forests are

already endangered, will take the most active and efficacious measures for their re-establishment."

The Section expressed also its interest in the aims and objects of the International Marine Conference at Washington, as well as its desire to see the works for the canalization of the Seine pushed to completion, so as to permit vessels drawing 19 to 20 feet of water to ascend the river to Paris.

In the Section of Historical Geography memoirs were received from M. du Paty de Clam on the ethnography and geography of the Gulf of Gabes, and from M. Marcel on Ottavio Pisani. M. Marcel gave also some information concerning a manuscript globe, attributed to Schöner, and now in the National Library. Father Brucker read a paper on the maps constructed by the Jesuits in China. M. Castonnet des Fosses gave a history of the commerce of Nantes with Spain, Flanders and Bremen, and sketched the relations of the Chinese Empire with the Greeks and Romans.

Abbate Pasha, President of the Khedivial Geographical Society, presented his views on the position occupied by the Negroes (the *Kush* of the inscriptions) among the Egyptians of the Pharaonic epoch. He called attention also to a remarkable paper on the Egyptian *stadium* by Mahmud-Bey, and to the fact that recent explorations had revealed numerous traces of vineyards in Egypt; and he believed that the culture of the vine in that country had been suddenly interrupted by the Mohammedan conquest.

M. Ludovic Drapeyron gave an account of the first national Atlas of France, dated in 1592; and M. Rouire spoke on the site of Lake Tritonis.

Baron von Schwerin read for the author, Mr. Dahlgren, a paper on the voyages of the Brothers Zeno. The Swedish author regards the Zeno map as a compilation of earlier maps and charts. M. Pector spoke on the historians who have mentioned Nicaragua, and M. Pawinski read a memoir on the scientific method applied to historical geography, illustrated by his own work on Poland. M. Eeckman presented M. Caron's memoir on the Roman mines in Tunisia and their utilization by the French. Colonel Coello, Honorary President of the Madrid Geographical Society, described very fully the Roman roads of Spain. The last act of the Section was to approve M. Jackson's proposition that "a biographical dictionary of travellers be prepared in each country." Beyond this approval the Congress could not go; and the task of setting each nation to work upon its dictionary naturally falls to M. Jackson.

The Didactic Section recommended the introduction of ethnography into the higher course, and the creation of special professorships of geography.

The Section of Voyages and Explorations unanimously declared "that the explorer in a new country has no right to bestow names unless there are no native inhabitants." This declaration should command the assent and the support of every enlightened geographer.

Communications were made by M. Masqueray, on the Tuaregs; by Count Cavalcanti, on the Paramanema River, on the cannibals of Brazil, and on the tribes of the Xingú; by Mr. Timmerman, on the Sunda Islands, and by Dr. Kan on the Moluccas; by M. Leclercq, on the monuments of Samarkand; by M. Sarrea Prado, on

the roads in the Portuguese colonies; and by M. Gauthiot, on the labors of the French expedition in Upper Laos. Colonel Coello announced that there would be held in Spain in 1892 a Spanish-American Exhibition. Mr. Cordeiro, of the Lisbon Geographical Society, presented a collection of maps and charts destined for the library of the Paris Society.

In the Anthropological and Ethnographical Section, Dr. Riedel read a paper on the natives of Rotti, in Netherlands-India. Dr. Hamy made a report on explorations undertaken by himself and M. de la Croix in southern Tunisia, and M. Charles Rabot described his observations among the Lapps and Fins of Russia. General Venukoff presented an important work on the Kirghiz, by General Grodekoff, and Dr. Maurel spoke on the origin of the Cambodian peoples. M. Capus described the country and the manners of the little-known Kafirs, of Central Asia, their language and their relation to the other ethnic elements of Asia. Prof. Waldemar Schmidt called the attention of the Section to the very full anthropological gallery in the Danish department at the Exposition. This gallery represented, he said, the present state of our knowledge with regard to the prehistoric age in Denmark.

At the general sessions of the Congress, held from time to time, there were many interesting papers read and addresses made. Mr. Lessar, Russian Consul at Liverpool, treated the subject of the changes in the bed of the Amu-Daria. M. Martel reported his observations in the exploration of the subterranean water-courses in the region of Les Causses. The ice-grottoes of the Jura were described by M. Ch. Faure, and those

of the Crimea by Mr. Grigorieff. Mr. Waldemar Schmidt summarized the experiences of Mr. Nansen in his perilous journey across Greenland, and Dr. Hamy read and commented upon a paper by Mr. Carl Lumholtz, the delegate from Norway, on the present and the future of Queensland. M. J. Borelli, recently returned from Abyssinia, gave an account of his travels in the Galla country. In reply to a question put by M. Savorgnan de Brazza, M. Borelli expressed the opinion that, while the Abyssinians were unable to make conquests beyond their own limits, they were strong enough to resist a Mohammedan invasion. Mr. Maurice Déchy, delegate of the Buda-Pest Geographical Society, read a paper on the central chain of the Caucasus. The southern slopes of the range, he said, were steeper than the northern, at least, in the central chain; but those of his hearers, who were acquainted with the ground, did not seem to agree with him, and M. Venukoff thought it better to avoid generalization on the subject. At the closing session on the 10th of August, Mr. Von Höhnelt entertained the Congress with the story of his journey to Mt. Kilimanjaro.

It is to be hoped that the precedent of delay in the publication of the full Report of Proceedings, established by previous International Congresses, will not be followed in the case of the one just held. The Antwerp Congress of 1871 issued the closing volume of its Report in 1872; but the Paris Congress of 1875 delayed its final volume until 1880, and it was not till 1884 that the publication of the proceedings at the Third International Congress, held at Venice in 1881, was completed.

THE TELEGRAPH CABLES OF THE WORLD.—Dr. A. Supan shows, in *Petermanns Mittheilungen, Band 35, IX*, the successive development of the telegraph-cable system from 1851 to 1888:

	Government Lines.	Private Companies.	Total.
	Length in Nautical Miles.		
1851-1868	1330	14500	15830
1869-1878	2400	52922	55322
1879-1888	6754	47094	53848
1851-1888	10484	114516	125000
In English miles,	12085.25	132006.37	144191.62

Except in the Persian Gulf, most of the cables laid before 1869 have been lost, and the actual length of working lines in the world is 113,038 nautical = 130,302.63 English miles. Of these 11,626 nautical miles are under Government administration (France possessing 3,197), and 101,412 nautical miles are in the hands of private companies, the most important being the Eastern Telegraph Company, with 18,838 miles, the Eastern Extension Australasian and China Telegraph Company with 12,035 miles, and the Anglo-American Telegraph Company with 10,438 miles.

MT. ST. ELIAS.—On pages 433-434 of the *Proceedings* of the Royal Geographical Society, for July, 1889, is a note from Mr. H. W. Seton-Karr, who attached himself to the Schwatka expedition to Alaska in 1886. Mr. Seton-Karr writes that when he returned to San Francisco from Alaska he was informed by the newspaper editors that any statement questioning the claim of the United States to Mount St. Elias would inflict an injury upon their reputation, and that he was, therefore, compelled to say nothing about it. He did well to keep

silence, for there is not a more fearful wild-fowl than your San Francisco editor, when he catches sight of a Briton making off with Mount St. Elias. The traveller survived to reach

The land where, girt with friends or foes,
A man may speak the thing he will ;

and devoted, as he must be, to the cause of truth even more than to the acquisition of mountains, he cannot but have read with pleasure, in the *Proceedings* for October, the following correction of several misstatements that slipped in among the things he willed to speak at a distance from San Francisco :

SUB-OFFICE, U. S. COAST AND GEODETIC SURVEY,
SAN FRANCISCO, CALIFORNIA,

August 6, 1889.

DEAR SIR : I beg to call your attention to the remarks of Mr. H. W. Seton-Karr upon the geographical position of Mount St. Elias, Alaska, on pp. 433, 434, of vol. xi. No. 7, New Monthly Series of the "Proceedings of the Royal Geographical Society," July, 1889.

As my name has been brought into the matter by Mr. Seton-Karr, I quote a part of his remarks :

"In 1874 the U. S. Coast Survey observed a series of vertical angles from Yakutat, about sixty miles distant, on Mount St. Elias. Their triangulation fixed the position of the mountain as lat. $60^{\circ} 22' 06''$, and long. $140^{\circ} 54' 00''$, or within six minutes of the boundary. This position was incorporated in Professor Davidson's 'Coast Pilot of Alaska,' he being the head of the Coast and Geodetic Survey. As I believe these were the only observations taken, and as there have been no later ones, it requires to be explained why the position of St. Elias was subsequently shifted. In the next edition of this volume, which is called 'The Pacific Coast Pilot,' and bears the date 1883, Mount St. Elias is forced to make a fresh jump, and this time clear over the boundary. This new position, for which no reasons are given, is lat. $60^{\circ} 20' 45''$ N., and long. $141^{\circ} 00' 12''$, or just 12 seconds over the line, and —needless to say—on the American side."

This extract contains several misstatements. I remark :

The title of the "Coast Pilot of Alaska," which I wrote in 1867-69, and of which I gave Mr. Seton-Karr a copy, is "United States Coast Survey, Benjamin Pierce. Superintendent. Pacific Coast. Coast Pilot of Alaska (first part) from Southern Boundary to Cook's Inlet. By George Davidson, Assistant Coast Survey, 1869. Washington, Government Printing office, 1869." This title shows : 1st, that the

work was published in 1869; 2d, that I was not the head of the Coast and Geodetic Survey; 3d, upon consulting the new edition, you will see that I am not the author of the latter.

An examination of my work of 1869 establishes the fact that on p. 62 I gave the geographical position of the mountain as "lat. $60^{\circ} 22' 6''$, and long. $140^{\circ} 54'$ ", in the tabulation of geographical positions on p. 206, I repeat the above; and in the column of authorities I note "Vancouver, Tebenkoff's Atlas."

In 1874 Acting-Assistant Dall made a rough reconnaissance of that region, and his report is given in full in the annual report of the Superintendent for the year 1875. On p. 182, there is exhibited in detail the "Determination of position of Mount St. Elias" as follows; lat. $60^{\circ} 20' 45''$, long. $141^{\circ} 00' 12''$.

This further shows: 4th, Mr. Seton-Karr erroneously ascribes the data which were published in 1869, to the year 1874; 5th, he does not even quote the data properly, and unqualifiedly asserts that these are the only observations that have been taken and that there are no later ones; 6th, that to prove his case he was obliged to make the ungenerous insinuation that the observations had been tampered with.

There is much that I might say about that expedition and Mr. Seton-Karr's crochet to have Mount St. Elias in British territory; but what I have herein shown is a fair sample of all the rest.

GEORGE DAVIDSON,
President of the Geographical
Society of the Pacific.

The Assistant-Secretary R. G. S.

RAILWAY MILEAGE IN THE UNITED STATES.—The first annual Report on Statistics of Railways in the United States, to the Interstate Commerce Commission, gives the following figures for the railway mileage of the country on the 30th of June, 1888.

The total length was 149,901.72 miles. Of these Illinois possessed 9,708, Kansas 8,437, Iowa 8,230, Pennsylvania 7,992, Texas 7,902, Ohio 7,523, New York 7,488, Michigan 6,346, Indiana 5,723, Missouri 5,711, Wisconsin 5,057, Minnesota 5,032, Nebraska 4,900, Dakota 4,293, California 3,713, Colorado 3,676, Georgia 3,596, Alabama 2,833, Virginia 2,777, Tennessee 2,477, North Carolina 2,433, Kentucky 2,294, Florida 2,147, Mississippi 2,118, Massachusetts 2,082, Arkansas 2,030, New Jersey 1,914, South Carolina 1,880, Montana 1,712,

Louisiana 1,501, New Mexico 1,313, Oregon 1,312, West Virginia 1,216, Maine 1,206, Maryland 1,126, Utah 1,122, New Hampshire 1,070, Arizona 1,061, Connecticut 999, Washington 986, Vermont 946, Nevada 914, Indian Territory 879, Wyoming 863, Idaho 807, Delaware 313, Rhode Island, 214, and the District of Columbia 31.

Comparing the railway extension with the area of each division, the District of Columbia stands first with 2.29 square miles to each mile of road. Massachusetts counts 3.99 square miles, New Jersey 4.08, Connecticut 4.91, Ohio 5.45, Pennsylvania 5.65, Illinois and Rhode Island, each, 5.83, Indiana 6.35, Delaware 6.55, New York 6.56, Iowa 6.80, New Hampshire 8.69, Michigan 9.28, Kansas 9.72, Vermont 10.10, Maryland 10.84, Wisconsin 11.08, Missouri 12.15, Virginia 15.29, Nebraska 15.68, South Carolina 16.25, Georgia 16.54, Minnesota 16.57, Tennessee 16.97, Kentucky 17.61, Alabama 18.44, West Virginia 20.38, North Carolina 21.48, Mississippi 22.10, Arkansas 26.53, Florida 27.33, Maine 27.41, Colorado 28.27, Louisiana 32.45, Texas 33.63, Dakota 34.73, California 42.64, Washington 70.18, Oregon, 73.21, Indian Territory 73.57, Utah 75.74, Montana 85.32, New Mexico 93.35, Idaho, 105.14, Arizona 106.50, Wyoming 113.38, and Nevada 121.06. The proportion for the whole country, exclusive of Alaska, is 1 mile of railway to 20.14 square miles.

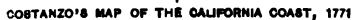
THE BAY OF SAN FRANCISCO.—There appears in the *Proceedings* of the American Antiquarian Society of Worcester, Vol. VI., Part 1, a letter from Mr. John T.

Doyle, of Menlo Park, California, on the subject of the discovery of San Francisco Bay.

Mr. Doyle, in a public address, delivered at the Commencement of Santa Clara College in August, 1870, called attention to the statements in Crespi's diary as to the discovery of the bay; and in October, 1873, a memorandum of his on the same subject was presented to the American Antiquarian Society by Col. J. D. Washburn. In this memorandum Mr. Doyle expressed the opinion that the first civilized men who saw the Bay of San Francisco were the members of Portolá's expedition in 1769; and that what the Spaniards had down to that time called the Bay of San Francisco was what we now term Sir Francis Drake's Bay. In his letter of Nov. 24th he says that these opinions have lately received confirmation on contemporary authority, through the discovery, by Prof. George Davidson, of the U. S. Coast and Geodetic Survey, of Miguel Costanzo's map,* *Carta reducida del Océano Asiático ó Mar del Sur, etc., 1771*. A tracing of this map was made by Professor Davidson and presented to the Worcester Society, which has courteously allowed its reproduction in this BULLETIN. It shows the "Puerto de S. Francisco," almost in the place of Drake's Bay, near the "Punta de los Reyes," and behind this the "Estero de S. Francisco" penetrating the land, and unmistakably designed to represent the Bay of San Francisco with its northern extensions.

Costanzo's map is sufficiently rare to be something of

* The title and descriptive note, quoted at length by Mr. Doyle, have suffered in the printing. *Goberero* is easily corrected, but the words *con cido* and *sin al adamente* do not show at once that they are meant for *conocido* and *señaladamente*.



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was no discovery in the strict sense of the term, for I found it in an old publication of Dalrymple's, about 1790, if I recollect rightly. I can refer to the volume when I reach home."

In closing his communication, Mr. Doyle calls attention to a passage in the text and a note in Bancroft's History of the Pacific States, Vol. XIII., p. 157. It is there said that Mr. Bancroft's assistant, "in the *Overland Monthly*, made known for the first time to the English reading public the statements of Cabrera Bueno and Crespí, and in a few brief notes put the subject (the question concerning San Francisco Bay) in its true light."

Mr. Doyle points out that the *Overland Monthly* article appeared in June, 1874, nearly four years after the first, and eight months after the second, of his own, publications on the subject of Crespí's diary. These publications are quoted in Vol. XIII. of the History, pp. 141 and 156, and Mr. Doyle infers, not unreasonably, that Mr. Bancroft had become acquainted with them before his assistant enlightened the English reading public. In view of this acquaintance with Mr. Doyle's work, the assertion made on p. 157 can only have found its way into print during one of those flashes of forgetfulness, which sometimes overtake men burdened with great cares.

CLIMATOLOGY OF BRAZIL.*—In the Rio *Revista do Observatorio*, Nos. 5, 6 and 7, Mr. H. Morize continues and finishes his sketch of the Brazilian climate.

At Recife (Pernambuco) the annual rainfall is nearly

* BULLETIN, A. G. S., Vol. XXI., No. 2, p. 232.

119 inches, the heaviest precipitation being in June and the lightest in December. (The proportions, as printed, reverse the statement.)

At Victoria, $8^{\circ} 9'$ S. Lat., the mean temperature of the year is 77° Fahr., the hottest month being February, with $80^{\circ} .06$, and the coolest July, with $73^{\circ} .4$. South-east winds prevail during the rainy season, and easterly winds for the rest of the year.

The rainfall at this point and at Colonia Isabel is about 40 inches annually.

At Bahia the mean temperature of the year is 79° , the extremes being 88° and 70° . The greatest heat is felt from December to March, but rarely exceeds 83° , while the average of the cool months of June, July and August is 75° . Rain is frequent, particularly in March, April, May and June, and again in October and November, and the annual fall amounts to 85 inches. The prevailing wind is the south-east, from April to September, and the north-east for the rest of the year.

The southern portion of Bahia and the provinces of Espirito Santo and Rio de Janeiro, with a part of the sea-coast of São Paulo and the eastern portion of Minas Geraes constitute the remainder of the sub-tropical zone. Not many observations have been made in Espirito Santo, but the mean temperature of the province is thought to be about 75° Fahr.

Rio de Janeiro possesses the most complete series of observations to be found in Brazil. The first of these were made in 1781 by the Jesuit Father Sanches Dorta; and after many interruptions at the beginning of the present century the series was taken up again with the creation of the Imperial Observatory, and has been con-

tinued without a break for thirty-seven years up to this day. According to these daily observations the mean annual temperature of Rio is $74^{\circ} .3$. The greatest heat is felt in January and February, $81^{\circ} .5$, and the lowest in July, $69^{\circ} .4$. The hottest year on record was 1868, with a mean of $75^{\circ} .3$, and the coolest 1882, with a mean of 72° . The hottest day was Nov. 25, 1883, when the mercury rose to $99^{\circ} .5$, and the coldest Sept. 1, 1882, when it went down to $50^{\circ} .3$.

In the hot season the heat increases from sunrise till the sea-breeze comes in from the S.S.E., between mid-day and 2 o'clock in the afternoon; but if from any cause the breeze dies away, the heat may rise to 86° .

The prevailing winds are alternately from the S.S.E. and the N.N.W. The former blow when the sun approaches the Tropic of Capricorn and with his passage towards the north the winds change to the N.N.W.

The rainy season at Rio is from November to April, and the yearly precipitation is 43 inches. Rain falls on 104 days in the year and thunder-storms occur on 29 days. Hail is rarely known. Father Sanches Dorta frequently noted in his journal the appearance of the Aurora Australis; but it has not been remarked at the Observatory.

The ancient Swiss settlement of Nova-Friburgo, which is situated 2' to the E. of Rio, on a spur of the Serra de Macahé, enjoys, through its elevation of nearly 3,000 feet above the sea, a charming climate, with a mean annual temperature of 63° , an average heat in the hottest month, January, of 69° and a mean of 57° in July and August.

Queluz, in the province of Minas, stands somewhat

higher than Nova-Friburgo, and has much the same climate.

In the western part of the province of Minas a true continental climate is found at the little city of Uberaba, situated 2,500 feet above the sea. At this place, according to Father Germano d'Annecy, the mean temperature is 70° and the minimum $27^{\circ}.5$. This statement is confirmed by Martino, who declares that a fall of snow is nothing uncommon in the region, which is almost on the twentieth parallel; and also by Dr. J. Hann, who relates that in some places between Barbacena and Ouro Preto there was in June, 1870, a temperature of 26° , that lasted for five or six days, and that at Barbacena the thermometer marked 21° .

At the station of Cascata, S. Lat., $21^{\circ} 33'$, on the Serra de Caldas, between the provinces of Minas and S. Paulo, the variations of temperature are even more marked, the observations for 1884 showing 104° for January and 32° for June.

All the neighboring country shares this continental climate. At Ribeirão Preto, four degrees and a half to the W. of Rio, and elevated only 1,700 feet above the sea, frosts are by no means rare in June and July.

S. Paulo, the capital of the province of the same name, stands on a table land of the Serra do Mar, and has a climate much like that of Ribeirão Preto. The annual mean is 63° , and frosts are frequent in June and July, though the mercury does not quite descend to 32° . From October to December the winds blow from the S. E., from January to March from the N. N. W., and during the other months from the N. E. or S. E.

On this table land, and on those of the neighboring provinces, the climate marks a transition between that of the sub-tropical zone and that of the temperate region.

The southern portion of S. Paulo and the provinces of Paraná, Santa Catharina and Rio Grande form the third great division of Brazil, with one of the finest climates in the world. The temperature is mild and the mean is always below 68°. The moderate cold of July and August is equally favorable to the health of Europeans and to the development of European industries; and for this reason the current of immigration has been almost exclusively directed to these provinces.

The distribution of the rains is different from that which prevails in other parts of the Empire, and the distinction between the wet and the dry seasons is much less marked.

At Joinville (26° 17' S.) the rainfall is 88 inches, nearly all in spring and summer, but on many of the highlands the rain comes in winter.

Snow is not rare, and at Lages (27° 43' S. and 3,200 feet above the sea) there fell between the 26th and the 30th of July, 1858, such a quantity of snow that 30,000 head of cattle perished. Light falls are frequent even at a low elevation above the sea, but at Vaccaria (28° 33' S.) not less than two feet six inches fell in August, 1879.

In the part of the province of Rio Grande south of 27° 5', the rains come principally in the winter.

At Curytiba, the capital of Paraná, the mean temperature is 68°, at Joinville the same, and at Nova Petropolis it is 66°. One of the most important cities is Pelotao, situated in 31° 46' S. Here there is a mean

annual temperature of 63° , the lowest point being 31° in June, and the highest 100° in January. Thunder is heard on 33 days and rain falls on 83 days in the year.

Mr. Morize concludes his survey with the observation that the hot zone of Brazil is not kindly to the European constitution, but that this readily adapts itself to the climate of the second zone and finds that of the third favorable to a perfect health and vigor.

It will not have escaped the reader's attention that the observations so far recorded are limited to the provinces on the coast of the great Empire, and that nothing is yet known of the conditions in the interior.

METEOROLOGICAL OBSERVATIONS AT MEXICO. — The *Observatorio Meteorológico-Magnético Central*, of Mexico, has issued a table of calculated results of observations, made during the years 1877–1888. The metric system is employed :

Barometer :	annual mean	586.42
“	greatest height	594.19
“	lowest	579.80
Temperature :	mean, in the shade	15.5
“	highest in 12 years (Apr.)	31.6
“	lowest “ “	1.7
Humidity :	annual mean	60
Rainfall :	total in 12 years	7424.9
“	greatest in the year (Aug.)	63.5
Cloudiness :	mean annual	5.0
“	prevailing direction	S.W.
Wind :	mean annual velocity	0.8
“	prevailing direction	N.W.

The Observatory is situated in N. Lat. $19^{\circ} 26'$, W. Long. (Greenwich) 6h. 36m. 27s. Height above the level of the sea, 2,282m. 5 (7,488.65 ft.). Height of the O of the barometric scale, above the side-walk of the National Palace, 17m. 04. Hypsometer, mean boiling

point, $92^{\circ} 88'$ (Fahr. 199.05). Magnetic Data : mean declination $8^{\circ} 16'$ from N. to E.; mean inclination $45^{\circ} 03' 03'' .5$.

THE COLUMBUS COLLECTION IN ITALY.—According to the plan decided upon by the Royal Commission the Collection will be divided into Six Volumes or Parts :

PART I.—*Writings of Columbus*.—Autographs and other writings, with critical illustrations.

PART II.—*Columbus and His Family*.—Origin of the Family, Birthplace of Columbus, Complete Collection of documents on the family and the person of Columbus, Medals and Portraits (supposed), Remains of Columbus : in Cuba or Santo Domingo ?

PART III.—*Discovery of America*.—Written Correspondence, with mention of other important voyages of the time, Contemporary Narrators of the discovery, Passages of Geographical Works unpublished, or existing only in very rare editions, in which mention is made of Columbus's discovery, or of those that followed and extended his, down to the year 1530.

PART IV.—*The Navigation and Cartography of the Discovery*.—Ships in the Time of Columbus, Scientific Resources, Nautical Charts and other instruments of navigation in use, Notices of Charts made by Columbus and by his brothers, Maps of the discovery down to 1530.

PART V.—*Monographs*.—Italian predecessors or successors of Columbus, to the year 1530.

PART VI.—*Bibliography*.—Columbian Bibliography, Italian Bibliography relating to the discovery of America.

Most of these parts have already been assigned to persons especially qualified for the work. Mr. H. Harisse is charged with the first part, the second has been confided to the Ligurian Sub-Committee, the third to Commissioner Berchet, the fourth to Commissioner De Albertis, and the fifth has been distributed among a number of scholars and scientific men. The sixth part has not yet been assigned.

The search made for documents in the Vatican archives has yielded good results, and interesting dispatches have been found in the Este Chancery at Modena ; but, according to the Italian Geographical Society's *Bollettino*, from which these facts are taken, the examinations made at Naples, Palermo, Cagliari and Florence had, up to August last, produced nothing of importance.

ROME AND OTHER ITALIAN CITIES.—A recent publication, issued by the Italian Ministry of Agriculture, Industry and Commerce, presents some interesting facts concerning the larger cities of the kingdom.

The population of Rome in the spring of 1870 was 226,022. It had risen, at the end of 1871, to 244,484 ; at the end of 1876, to 272,560 ; and it amounted, on the 31st of December, 1881, to 300,467. The latest enumeration, made on the 31st of December, 1888, showed a total of 401,044.

On the 31st of December, 1881, the whole area of the city was 14,674,500 square metres. On the 31st of March, 1888, the area was 15,711,500 square metres. The ground covered by buildings, including court-yards and gardens attached to houses, but leaving out the

space occupied by churches and monuments, increased from 3,403,150 square metres on the 1st of January, 1882, to 4,718,115, on the 31st of March, 1888.

The streets of the city covered 2,492,469 square metres, on the 1st of January, 1882, and 3,487,861, on the 31st of March, 1888.

The churches and monuments occupied 578,170 square metres in 1882 and 598,220 in 1888.

The public fountains furnishing water number 356, classed as follows: 11 monumental, 16 smaller, 162 ancient sources, and 167 new ones, opened since 1870.

Nine other places are compared with Rome. Naples, still the largest city of the Peninsula, has done no more than hold her own. In 1881 she had 494,314 inhabitants and in 1888 512,000. The others are :

Milan, (1881).....	321,839	(1888).....	406,592.
Turin, "	252,832	"	305,144.
Palermo, "	244,991	"	261,571.
Genoa, "	179,515	"	206,088.
Florence, "	169,001	"	no ret'rn
Venice "	134,810	"	149,635.
Bologna "	123,274	"	136,608.
Catania "	100,417	"	no ret'rn

The population of the kingdom, on the 31st of December, 1881, was 28,459,628. On the 31st of December, 1887, the number was found to be 30,260,065 ; an increase of 1,800,437. For the same period, 1881-1887, the total emigration was 1,154,199. It is clear, therefore, that the large cities do not grow at the expense of the country, but by a slow and healthy process.

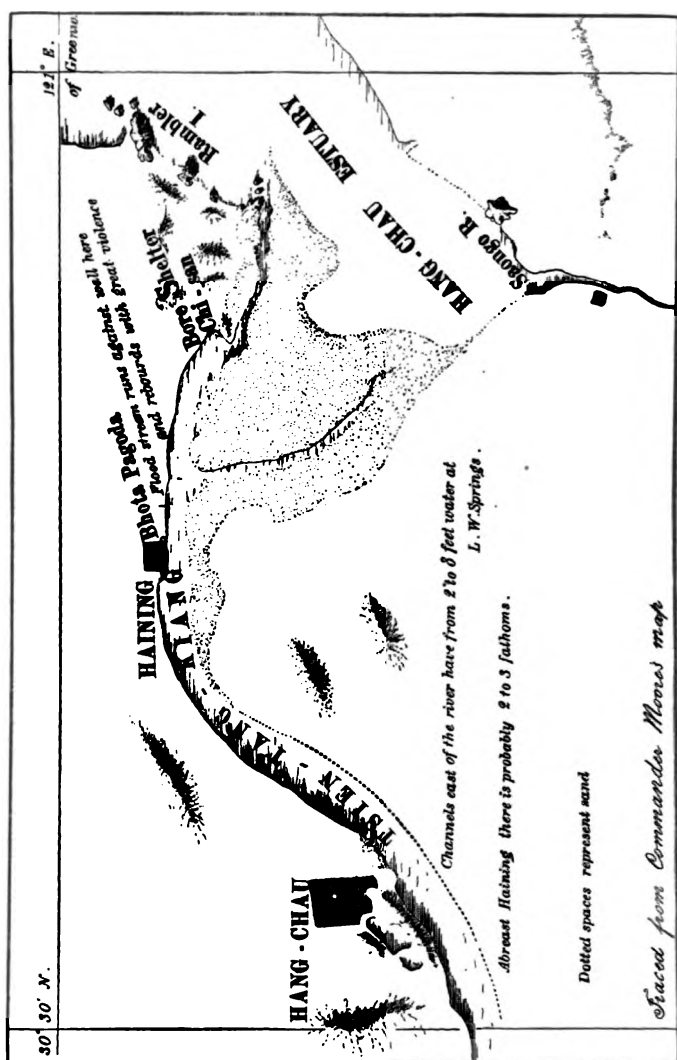
There is nothing abnormal in the proportions of the Italian emigration. It bears comparison with that from the British Islands. The population of the United

Kingdom was, on the 31st of December, 1871, 31,857,338. The census returns for 1881 showed a total of 35,241,482; a gain in the ten years of 3,384,144. The emigration for the years 1881-1887 amounted to 2,498,540 persons, one-fourth of them classed as foreigners, so that the actual British emigration for the period was 1,873,905. The increase of the population, taking the average of the ten years ending with 1881, would be, for seven years, 2,368,898; and the actual gain for the seven years, less the emigration, would be 494,993.

THE BORE OF THE TSIEN-TANG KIANG.—Commander Osborne Moore, R. N., contributes to the Journal of the China Branch of the Royal Asiatic Society, a paper on the Bore of the Tsien-Tang Kiang (Hang-Chau Bay).

The Hang-Chau Gulf, he says, had always excited his curiosity because, though it led into the heart of a great silk country, it was shunned by seamen. In his paper he has endeavored to show why the Tsien-tang is blocked.

The furthestmost limit in the Gulf for safe navigation is an island (Rambler Island) at the S. W. extremity of Chapu Bay. Here, on the 19th of September, 1888, Commander Moore's vessel, the *Rambler*, was moored. A tide-pole was erected and observations were made of the rise and fall of the water for three days and nights, beginning with full moon. At the same time observations were noted at West Volcano Island, 45 miles E. of Rambler Island; and a fortnight before records had been made simultaneously at West Volcano Island and Chang-tau. It was therefore possible to trace the pro-



gress of the tidal wave from the ocean to the estuary of the Tsien-tang. The miles are geographical.

September 20th a start was made, with the first of the

flood-tide, in two steam-cutters and a sailing-cutter, to meet the Bore. All went well for three hours, when the ground was struck, with the tide running 10 to 11 miles an hour, and the water rose 9 feet in half-an-hour. Fortunately, the vessels had missed their way, the chart being incorrect, and instead of meeting the main Bore had dropped into the south branch of it. That afternoon the river was found, and the boats were run ashore opposite Haining, with anchors laid out and buried and every precaution taken for the next flood. The keels of the boats were 7 to 8 feet above low-water, and they must have been half-a-mile from the nearest part of the Bore. The steam-cutter had 33 fathoms of stout chain with a 60-lb. anchor, backed up by 4 iron weights of 56 lbs. each, and a 2 cwt. bag of coal on the bight of the chain, $1\frac{1}{2}$ fathoms from the anchor.

The sailing-cutter had a 60 lb. anchor buried in the sand, with 30 fathoms grapnel taut, and 2 2-cwt. bags of coal on the grapnel, near the anchor.

It was a still night, with a little rain. The murmur of the Bore in the distance was heard at 11.29; the cascade could be seen at 11.55, and it passed with a loud roar at 12.20, well over on the north bank of the river. All that could be seen was a steep slope of white water, over-falling and pouring over itself as it advanced, the river filling up to the level of the flood as the Bore went by. At 12.25 the boats floated at once. The steam-cutter brought up with a jerk and drove to the westward, the sailing-cutter following, and both dragged for a distance of 3 miles in 25 minutes. The strength of the current must have been at least 10 miles an hour, and the height of the Bore was 10 to 11 feet. When

the anchors of the cutters were weighed it was found that the flukes which had been in the sand, and a great part of the chains, were burnished bright like polished silver. The coal in the bags, with the exception of $\frac{1}{2}$ -cwt. in one bag, was all washed out, and the bags were filled with sand tightly packed.

The sudden rise of water, which occurred with every flood at Rambler Island, commenced this night at 9.30, so that there was an interval of nearly 3 hours between the appearance of the Bore there and at Haining.

September 21st, at 9.45 A. M., an overfall was seen 4 or 5 miles in the offing to the N.E. It reached the *Rambler* at 10.15, and disappeared to the westward past Rambler Island. Here the water suddenly began rising at 10 A. M., and rose 13 feet 11 inches in 1 hour.

From the south bank of the entrance of the Tsien-tang Kiang the Bore was seen approaching along the sea-wall between Haining and Chi-san at 12.24.

The weather was calm and there was a good deal of mirage. The appearance was that of a long, crested wave, breaking in places, in others only about to break; the top of the flood curving towards the *Rambler* and drawing back, hurried on by the great speed of the Bore. At 12.47 the Bore passed Haining Pagoda, the front part a white cascade of foaming water, and the south side a long line of breakers and wall of water, tapering from the front to the smooth following water half-a-mile behind, the breakers discharging outwards towards the south bank of the river.

For a long distance behind the crest there was on the top of the Bore broken water, in which no ordinary boat would have lived, and conspicuous above the disturbed

water a second roller or miniature Bore occasionally rose up, and after moving onwards with the rest for a time, would leap up as if struck by some unseen force, and disappear in a cloud of spray. The height of the Bore was 9 feet, but the broken water behind it could not have been less than 13 or 14 feet above the level of the river in front. The Chinese said this was not a high Bore. Nine junks came up behind the disturbed water, with sails set (there was no wind), and entered the river at great speed.

A feature worth noticing was the deliberation of the curved side in breaking. It looked, at times, as if the great speed checked the curve just as it was about to make its arch over on the sand.

Commander Moore finds himself obliged to disagree with Dr. Macgowan, who has recorded his observation of a Bore 30 feet high at Hang-chau, and has affirmed that the cascade was higher off the city than at the mouth of the river. Commander Moore argues that a Bore cannot be higher than high-water spring tide, which has a range at the mouth of the river of 19 to 20 feet, while the cascade there is generally three times as high as it is off the city of Hang-chau.

During the few days, stay of the *Rambler* in Hang-chau Gulf, her cables were much damaged by the violent ebb-stream, which ran with its greatest velocity between the second and third hour after high-water; and when they were weighing anchor on the 24th of September, a north-east wind sprang up with the flood-tide, and a severe overfall surrounded the ship for two hours with waves as high as the gunwale. She got away at last with the loss of all the pauls and bars of the capstan.

The junks that frequent Haining ground one and a half to two hours after high-water on a platform of stones enclosed by piles alongside the sea-wall. This platform is 1,100 yards long and 20 feet wide, and 7 to 8 feet above low-water ordinary spring tide. It is protected at the eastern end against the Bore by a semi-elliptical buttress, 253 feet long and 66 feet wide. The sea-wall is said to be more than 500 years old. It extends without interruption to Chi-san eastward and 19 or 20 miles up the river. It is about 30 feet wide and is faced with blocks of stone 5 feet long, 16 inches broad and 14 inches thick, laid endways out and joined together by rivets of iron. Its top is 3 to 4 feet above high-water. About 1,000 men are constantly employed in its repair, and the 12 miles of it that came under Commander Moore's inspection were in excellent condition. Behind the sea-wall is an embankment from 50 to 60 feet wide, and this is continued with more or less regularity from the Tsien-tang Kiang to Woosung, round Yangtze Cape, a distance of 120 miles.

Commander Moore returned to Haining on the 4th of October, and observed the Bore for four days. According to the natives, no one of the cascades seen in these two visits was as high as the highest winter Bores.

The Bore occurs about the time of full moon and new moon and, speaking generally, passes Haining as the moon crosses the meridian.

The Chinese declared that the Bore passed Haining with every flood-tide throughout the year, but this statement lacks confirmation.

The causes of the Bore are three :

1. The funnel shape of the Hang-chau Gulf, which is

open to the eastward, directly in front of the tidal wave from the Pacific. The Gulf is 50 to 60 miles wide at the mouth and about 10 miles wide at the narrower part where navigation ends, and the general depth is much greater across the mouth than it is in the western part.

2. The large area of sand-flats at the head of the Gulf.

3. The out-going stream from the Tsien-tang Kiang.

If Dr. Macgowan has overestimated the height of the Bore in the Chinese river, he is sobriety itself compared with some of those who have described the *pororoca** of the Amazon. Commander Moore quotes from Alison's "History of Europe," chap. 67, a passage in which occurs the following lively picture of the phenomenon :

"In the shock of the enormous masses of water, a ridge of surf and foam is often raised to the height of a hundred and eighty feet ; the islands in the neighborhood are shaken by the strife ; the fishers, the boatmen and the alligators withdraw trembling from the shock."

Naturally enough, the historian's rhetoric reduced Commander Moore to the state of an alligator and a boatman. "I rose from the perusal of the description," he says, "with a feeling of humiliating inferiority, and

*The *Century Dictionary* (art. BORE) spells this word *pororoca*, but the true form is the one given by the Brazilian writers. To quote but two : the *Corografia Brasileira*, vol. 2, p. 260, defines the bore as the result of the encounter between the river current and the tide, the shock causing "very rough waves, called *porórócas*," (ondas encapelladas, chamadas *porórócas*) ; and the *Diccionario Geographico*, of Lopes de Moura, vol. 1, p. 44, says that the phenomenon is observed "with every tide at the times of new and full moon ; the natives of Brazil call it *poróróca* ;" (em todas as mares de lua nova e cheia ; chamão-no os naturaes do Brazil *poróróca*).

the conviction that nothing would astonish me in future, . . . quite prepared . . . to learn that there is a Bore, about the globe somewhere, as high as the ball of St. Paul's Cathedral."

EARTHQUAKE OBSERVATIONS IN JAPAN IN 1886.—In the *Transactions* of the Seismological Society of Japan, Vol. XIII., Part I., Mr. John Milne presents a translation, with prefatory note and general observations, of a Report published by the Meteorological Central Observatory at Tōkyō. This report refers to observations, made at some 650 stations in various parts of the Empire in 1886, and gives in a second portion the analyses of earthquakes recorded by instruments during eleven years at the Observatory.

The total number of earthquakes in 1886 was 472, while in 1885 there were 482. The districts neighboring the Japan Sea felt few or no shocks; the ranges of mountains forming the back-bone of the mainland and passing between Tosan, Hokuriku, Sanin and Sanyō, seeming to divide the country into two portions, one of which is constantly shaken, while the other is almost undisturbed. The earthquake seasons are not well defined. The monthly average for 1886 was 39.3. March, May, August, September and December were above the average and the other months below it. Taking the four seasons, the greatest number of shocks occurred in spring and the smallest in autumn. In 1885 the contrary was the case. Taking the time of the day for the two years there were more earthquakes between noon and midnight than between midnight and noon.

The areas of the districts shaken are given in square

ri (1 square *ri*=5.95 square miles). The total area shaken in 1886 was 92,050 square *ri*, or 3.8 times the total area of the country. In 1885 the area shaken was 132,300 square *ri*. In 1886 349 shocks were limited to less than 100 square *ri*, 104 extended over more than 100 and less than 1,000, 19 were felt through an area of from 1,000 to 4,000, and one shook an extent of more than 5,000 square *ri*. The intensity was variable. With regard to origin, 228 shocks may be traced to the coast or under the sea, and 244 originated beneath the land. These latter merely caused limited disturbances.

The observations do not strikingly illustrate the relation of earthquakes to volcanoes. Many shocks were felt in the districts of Musashi, Kazusa, Shimōsa, Kōdzuke, Shimotsuke and Hitachi, all nearly inclosed by ranges of volcanoes, but there were many earthquakes also in Kii, which is quite apart from any volcano.

There are many provinces in which there are volcanic peaks, but where no earthquakes have been felt. One of the severe earthquakes of the year occurred on the 13th of April at 5.50 A. M. Its direction was not uniform, but was from south-west to north-east in several of the places most strongly shaken, and in two places the vibrations continued for three minutes. Its origin seemed to be in the Pacific. At about dawn of the same day there was an eruption of Mount Tarumai, in Iburi, Hokkaido (Yesso), and a feeble shock was felt at Nemuro in the same island.

In the eleven years, 1876–1886, during which systematic records were kept at Tōkyō, there were 958 earthquakes. The largest number for any one year was 77, in 1880; the smallest, 32, in 1883. The average for the

seasons was 15. There were more than 15 in the spring and in the winter, and the numbers for summer and for autumn fell below the average. The highest average was for the winter months and the lowest for the summer.

Generally speaking, the disturbances are frequent at night, especially from 8 to 9 P. M., during the six months from July to December. No very severe shock has occurred at Tōkyō since the observations were begun.

Nothing definite has yet been found as to the relation between earthquakes and atmospheric pressure. With regard to temperature, the shocks were numerous when it was falling, few when it was settled, and tolerably frequent when it was rising. Many earthquakes affect but a very small area, and it is Professor Milne's belief that if instruments were more generally distributed throughout Japan and the number of observers increased, the number of shocks recorded might easily be increased to 1,000.

LIEUT. TAPPENBECK'S LAST REPORT.—A few pages of the *Mittheilungen aus den Deutschen Schutzgebieten*, Band II, Heft III, are devoted to the memory of Lieutenant Tappenbeck, one of the latest victims of the African fever; and in the same number appears his last report, written at Kamerun, July 12th, while the hand of death was on him. The report, he says, is brief, but will be followed by one containing more ample details. Captain Kund set out from the Jeundo Station for the coast, on the 12th of March, with sixty persons. Next day natives reported to Lieutenant Tappenbeck that Kund's company had been fired upon by the Jande and

Jatenge ; but the Jeundo and other small tribes remained friendly and peaceful, and offered no interruption to the work on the Station buildings. Supplies of food came in daily, yams, bananas, manioc, sweet potatoes, maize, ground-nuts, palm oil, pumpkins, pine-apples and lemons, besides eggs and fowls, goats and sheep.

The Ngumba, the only tribe that could have blocked the road from the Jeundo country to the coast did not dare to show any hostility to the Germans. This tribe is dwindling physically and morally, and must in no long time disappear before the Bulei. "Other tribes," says Lieutenant Tappenbeck, "neighbors of the Jeundo, are always on bad terms with them, for the most part through envy, because the whites dwell in the Jeundo territory ; though it may very well be, that this tribe turns our presence to account in its quarrels by threatening, without our knowledge, to call upon us for help. The Ngumba constantly asked us to aid them against the Bulei. I have always refused these requests for the aid of our weapons, and have sought to make the people understand that we were friendly to all, and that though we lived among the Jeundo, every one, whether Toni or Bane, or Jatenge, or Jetudi, or Tinga, was free to come to us."

This was Tappenbeck's rule in African travel.

On the 9th of May orders came to march to the Sannaga River. The start was made on the 15th with 120 men, and on the 24th the Sannaga was reached at about the point occupied the year before. Four days were lost in order to recover a stolen gun. On the 27th the party arrived at the capital of the Chief Ngirang. This town, which lies in $4^{\circ} 42'$ N. Lat., and about 12°

25' E. Lon., contains 500 or 600 huts and 1,800 inhabitants, and is one of the greatest ivory and slave markets of the southern Adamaua country, to which it belongs politically, though not geographically. The German officer and his people were received in the most friendly way, in spite of the fact that Guatare, the village they had been forced to burn the previous year, belonged to Ngirang's land and was ruled by one of his brothers.

During the six days of their stay the chief supplied all their wants without compensation. Lieutenant Tappenbeck accepted the first gifts forced upon him—four elephant tusks and a native robe—but refused to take any more, telling the chief that it was impossible to take presents for which no equivalent could be offered. To this the chief replied that he did not make presents in order to have something given to him in return; “an answer,” says Lieutenant Tappenbeck, “which I then heard for the first time in Africa.” These gifts that were sent back were a quantity of very valuable ivory and 120 women, for the chief had a royal mind.

It was not easy to send messages from Ngirang's town to the coast, for there is no friendly feeling between the Kamerun coast tribes and those of the Adamaua region. These latter are great slave-hunters, and while the German party was staying with Ngirang, some of his warriors brought in 180 men, women and children as prisoners, and 100 slaves, mostly women, were ready to be sent to Iola. The district on the northern bank of the Sannaga, passed over by the expedition of the preceding year, was completely devastated. Whole villages were demolished and those of the natives, who escaped

from the slave-hunters, took refuge on the islands of the Sannaga. All this was the work of the chief Mango, whose town lies two days' journey to the eastward of Ngirang's. It was Lieutenant Tappenbeck's purpose to visit this slave-hunting chief at a later day. The northern side of the Sannaga, he concluded from what he saw, would soon be unable to supply victims for the trade, and the hunters would cross the river to the thickly-peopled districts on the south. Ngirang and Mango sent their slaves and ivory to Sokoto, Adamaua and Bagermi. The dealers said that the greater part of the merchandise went still farther, from Sokoto to Salaga, which supplies copper, and from Bagermi to Bornu, and probably to East Africa.

"These names," says Lieutenant Tappenbeck, "are familiarly known to every dealer." "It is my firm conviction," he adds, "that the Jeundo Station will become a great protection to the tribes in the neighborhood. No slave-hunters will venture to invade a land where a white man has his house, and it would be ill for them if they did, for I would undertake to defeat chiefs like Ngirang and Mango with no more than 100 well-armed men. Their success has been won by the sound of their names; and when Ngirang sends out 50 warriors, they are enough to put 500 enemies to flight, such is the spell of a terrible name over the minds of the blacks, not only here, but throughout Africa. If our Station can hold out with the same success against the hostile tribes for a year, a single European with thirty men will be enough to enforce respect. It is of great importance to keep the roads open towards the Adamaua country, so that we may become thoroughly acquainted with the

relations of that district. This will take years, but we shall then be in a position to decide whether it is possible to suppress the slave-trade, and how this is to be done."

He returned to the Station on the 10th of June, and for some days the people came in crowds to see the men who had been to Ngirang's town and had actually come back. A number of the Jeundo natives wanted to go with the Germans to the coast. Lieutenant Tappenbeck chose five men, among them three sons of a chief, named Zonu, on whose ground the station stood. On the 17th of June he set out with 138 persons, and five hours after shots were fired at the caravan by natives of the Jatenge tribe. The next village was immediately occupied and put in a state of defence. These Jatenge belonged to the tribe that had attacked Kund's party. Three months before they had fallen upon the Jeundo, and as these had asked help of the Germans and had been refused, the Jatenge perhaps imagined that the white men feared them.

Lieutenant Tappenbeck soon undeceived them. On the 20th of June a party of 20 men fell upon the assembled force of the hostile tribe, with which the Jande had united themselves, while they were all engaged in wardances, and struck such terror into them that they fled without firing a shot. Two of their most prominent chiefs and nine others were killed, and the number of wounded must have been considerable; and the survivors did not reappear.

This result greatly pleased the German commander, who had seen for some time that a collision with the natives was rather to be desired than avoided in order

to re-establish the belief in the invincibility of the white men. The Jetudi, who were before planning an ambush for the expedition, made haste to send messengers with protestations of their friendly feelings. Five days after the fight the chief Zonu said: "Now there is nothing to hinder your march to the coast. No one will meddle with you, and if you send a messenger with letters, he will go through in safety." It was easy to believe he meant what he said, for his sons were with the party and free to withdraw if they wished.

The Germans had five men wounded and not one killed, and this result seemed to the natives a miracle.

On the 4th of July the Kribi Station was reached after twelve extraordinary forced marches. Eighteen Mpangwe, whose time had expired, were left there.

In closing his report the young officer says he had been suffering for some time with fever, but that all the people, left at the Jeundo Station, were in good health.

STANLEY'S TRIUMPH.—The letters and the telegrams have told the result of Stanley's march through the unknown centre of Africa.

The story is not yet put into form. There are breaks and lapses in the narrative, and dates—always a weak point in Stanley's accounts—are often wanting; but the explorer has returned from the wilderness with an immense accession of renown, with new discoveries, not yet reconcilable with previous reports, and with Emin Pasha himself,* for whose rescue the expedition was undertaken. The first dispatch was received by the Emin

* Not alone, but with his daughter (*filiola auctum*, in Ciceronian phrase,) and, apparently, no mother for the child.

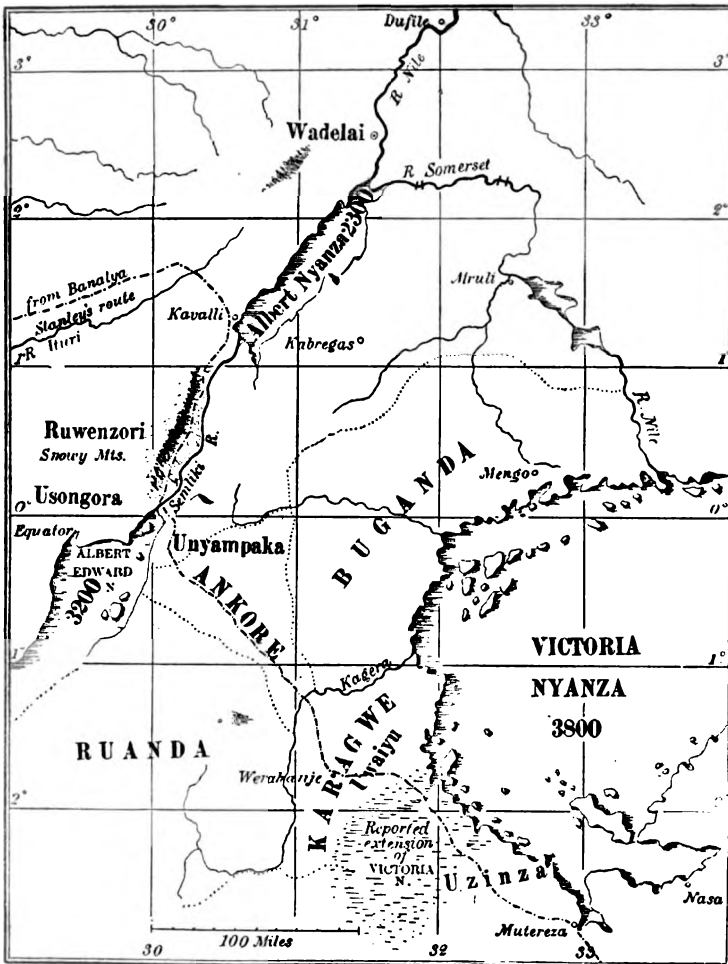
Relief Committee in London on the 4th of November. It announced the capture of Emin and Jephson on the 18th of August, 1888, the revolt of Emin's troops and their union with the Mahdists, and a subsequent reverse of the latter. It added that a letter waiting for him near the Albert Nyanza urged the necessity of Stanley's arrival before the end of December, that he arrived on the 18th of January, that he waited from the 14th of February to the 8th of May for the fugitives, and that he then left the Albert Nyanza, homeward bound.

Nothing was said of what occurred between the 18th of January and the 14th of February, and the rest of the dispatch read :

" By the route taken I traversed the Semliki Valley, the Awamba, the Usongora, the Toro, the Utraiyana, the Unyampaka, the Ankori, the Karagwe, the Uwaiya, the Uzinza, the South Victoria and the Nyanza. No hostile natives were met. Since we left Kabrega we travelled along the base of the snowy range Ruwenzori. Three sides of the Southern Nyanza or Nyanza of Usongora, which is called now Albert Edward Nyanza, are about 900 feet higher than Albert Nyanza, having an exit at Semliki which receives over fifty streams from the Ruwenzori and finally enters the Albert Nyanza, making the Albert Edward the source of the southwest branch of the White Nile, the Victoria Nyanza being the source of the southeast branch."

The map shows the supposed route to the southern end of the Victoria Nyanza, beyond which, about 350 miles to the southeast, lies Mpwapwa.

The Ruwenzori Range is a real addition to the maps, and it is something to have settled the relation of the



STANLEY'S ROUTE TO MPWAPWA.

Muta Nzige (Albert Edward Nyanza) to the Nile system, though it must be regretted that Stanley felt himself free to baptize this body of water. He has made wonderful discoveries, but his taste in names is deplorable.

Variety is the spice of geography, as well as of life. and the compliment to the Prince of Wales would have been the same if the lake had been called H. R. H.

The extension of the Victoria Nyanza to the south-west (indicated on the map) is, of course, to be accepted as news, though it contradicts Stanley's previous reports in his "Through the Dark Continent," Vol. I, pp. 156-186, 211-241, Vol. II, p. 18: "The saucy English-built boat which had made the acquaintance of all the bays and inlets of the Victoria Nyanza," etc.; and their restatement, in substance, seven years later, in "The Congo," Vol. I, p. 20: "The Dark Continent had been traversed from East to West, its great lakes, the Victoria Nyanza and the Tanganika, had been circumnavigated," etc.

The smallest area assigned to the extension just discovered is 2,000 square miles, the largest 27,000; and it ought to have been visible at the time of the careful circumnavigation.

Burdened as he was with anxieties and pre-occupied with his one great object, the rescue of Emin, Stanley could give but little attention to the details of exploration, and much has necessarily been left to a future day and, it must be hoped, to him.

Writing, as he evidently did, under a pardonable sense of impatience at the obstacles interposed by Emin, when everything was ready for his safe retreat, Stanley seems yet to have allowed himself too great a licence in his expressions. The reproach of weakness and lack of resolution, nowhere directly made, underlies all his remarks concerning Emin.

It is implied that the revolt of Emin's troops was prima-

rily due to the feebleness of their commander ; an implication the more ungenerous that Stanley has the ear of the public.

When it is remembered that Emin Pasha maintained his authority and controlled his vast Equatorial Province from the date of his appointment by Gordon in 1878 down to the present year, with no other European help or advice than that of the Russian, Dr. Junker, for a time, and that of Captain Casati through nearly the whole period, it is not too much to say that any suggestion of incompetence on his part simply discredits the man who makes it.

Stanley has perhaps an inadequate appreciation of other men's work, but his letters show that his success has only strengthened his trust in the protection of an overruling Providence. This is the mark of an earnest nature. There is no reason to believe that the ruin of all his hopes has availed to shake the faith of Emin, and it is more than probable that the Mahdists recognize in their own conquest of the Equatorial Province the direct interposition of God.

The United States : Facts and Figures illustrating the Physical Geography of the Country, and Its Material Resources. Written for, and published in part in, the Encyclopædia Britannica (Ninth Edition). By J. D. Whitney.
Boston, 1889.

Professor Whitney says, in his preface : " As published in that work (the Encyclopædia Britannica), portions of the matter furnished were found to have been omitted altogether, and other portions materially altered by attempts at condensation, so that the meaning was often

obscured, and sometimes even rendered entirely unintelligible. . . . Under these circumstances I have thought it best to reprint the article as originally written, with very few alterations, and these mostly in the form of notes."

Professor Whitney has rather understated his case. His article, as printed in the *Encyclopædia Britannica*, contains less than half the matter of the present work, exclusive of the Appendix, and the student rises from the comparison of the two with the uncomfortable feeling that other articles in the great book of reference may have suffered to a like extent at the publishers' hands.

It was a difficult task to present within a moderate compass an account of a territory so vast as that of the United States, and the work has been well done, with no less regard to the interest of the subject than to accuracy of statement.

The divisions are : Physical Geography and Geology, Political and Natural Subdivisions, Climate, Forests and Vegetation, Scenographical, Population, and Immigration, The Public Lands, Mineral Resources, Agriculture, Manufactures, Foreign Commerce, and an Appendix, devoted to a Sketch of Geographical Discovery on the Pacific Coast, a Sketch of the Progress of American Cartography during the Past Half-Century, and Remarks on the Methods by which the Elevations of Mountains in the United States have been determined.

Professor Whitney's Theory of the Prairies, which is the result of years of investigation on the spot, will be called in question. He is convinced that the real cause

of the absence of trees on the prairies is "the physical character of the soil and especially its exceeding fineness, which is prejudicial to the growth of anything but a superficial vegetation, the smallness of the particles of soil being an insuperable barrier to the necessary access of air to the roots of a deeply-rooted vegetation." It is found that wherever in the midst of this fine soil coarse or gravelly patches exist, there dense forests occur. This theory that fineness of soil is fatal to tree-growth finds its most remarkable support in the fact that in Southeastern Russia the limits of the *black earth* and the treeless region are almost exactly identical.

It will surprise many to learn that the value of the wood consumed as fuel in the United States was, in 1880, three times as great as that of the coal mined. "In fact," says Professor Whitney, "the timber of the country is the greatest of all its material possessions;" and he seems to be entirely free from the feeling of anxiety with which many regard the disappearance of our forests. "The timber," he says, "is restored, after destruction by man, by the kindly hand of Nature. This is the case, at least, over the whole of the once densely-timbered portion of the country, where the various growths succeeding each other after the primal forest has been removed offer a satisfactory substitute for that which has been made use of, either naturally or as an easily attainable result of cultivation."

It may be objected to this cheerful view of the situation, that very many tracts, once fully timbered, are now bare and desolate; but even the kindly hand of Nature must sometimes feel the need of repose.

The Bermuda Islands: A Contribution to the Physical History and Zoology of the Somers Archipelago. With an Examination of the Structure of Coral Reefs. By Angelo Heilprin. With Additions by Prof. J. Playfair McMurrich, Mr. H. A. Pilsbry, Dr. George Marx, Dr. P. R. Uhler, and Mr. C. H. Bollman.

8vo.

Philadelphia, 1889.

Extremes point to each other. Professor Heilprin's scrupulous enumeration of those who have aided him in his work recalls, by contrast, the practice of a writer farther to the West. If the historian may justly be reproached with putting a small part for the whole, Professor Heilprin cuts up the whole into too many parts.

About half the present volume is devoted to the zoology of the Bermudas, and the conclusions arrived at are:

That the fauna is a wind-drift and current-drift fauna, the aquatic animals belonging to the West Indies, the birds and insects to North America, though some portion may have come from Eurafrica, while the terrestrial Mollusca and the arachnids and echinoderms may have been partly developed from a fauna existing on the spot before the present physical conditions were established. That the *currental* water which separates the United States from the Bermudas is a practically insuperable barrier to the direct passage of marine animals from one region to the other, and that an arm of the sea may stop marine animals as effectually as it would land animals.

These views accord with those of Mr. Wallace.

The physical history and geology of the Bermuda

group, as read by Professor Heilprin, show that elevation and subsidence both marked the region in its development and these conditions, he says, "are more in consonance with the Darwinian hypothesis than with any other."

In the chapter on the Coral-Reef Problem, Professor Heilprin takes a position of antagonism to Mr. Guppy and Prof. Alex. Agassiz, and maintains, after examining their objections to the Darwinian view, that the theory of subsidence accords best with the facts and may be said to be in substantial harmony with them. Mr. Agassiz asserts that the Florida reefs have not been assisted in their upward growth by elevation, but Mr. Heilprin declares that there is, in the regular horizontal limestone beds of the southern part of the peninsula, the most conclusive evidence of elevation, even as late as the Pliocene and Post-Pliocene periods, and that there is every reason to believe that this upward movement did not stop short of the Coral-forming tract. He thinks it probable that the Straits of Florida and some of the deep channels separating the West Indian islands were formed through subsidence. The case is still before the Court, and not many now living may hope to see it decided.

In the notes on the zoology of the Bermudas, Professor Heilprin says: "As might have been anticipated the greatest profusion of animal life was found on the edge of the growing reef itself, the shoals surrounding the cluster of rocks on the northern barrier known as the North Rock. The wealth of forms occurring here almost transcends belief. . . . All the dredgings were confined to depths within 16 fathoms, which also

represents the greatest sounding made by us in the lagoons."

The list of the marine and land forms fills about 100 pages, and many types are represented in the plates that illustrate the work ; but there is no index.

The Ethnologic Affinities of the Ancient Etruscans.
By Daniel G. Brinton, M. D.

Philadelphia, 1889.

This contribution to the literature of the Etruscan puzzle was read before the American Philosophical Society in October last.

Dr. Brinton spent some time in the summer of 1889 among the Kabyles, and when, not long after, he came to study the portrait busts on the Etruscan tombs, he was struck with the resemblance between the two types. This incident led him to make a more extended examination and, as the result of this, he advocates the Libyan origin of the Etruscans. His arguments are :

1. Testimony and tradition assert that the Etruscans came into Italy across the sea, from the south.
2. Physically, they were tall and of blond type, with dolichocephalic heads, like the ancient Libyans and the modern Berbers and Guanches.
3. In the position assigned to woman and in the system of federal government the Etruscans and the Libyans were in accord.
4. The phonetics, grammatical plan, vocabulary, numerals and proper names of the Etruscans present analogies with the Libyan dialects, ancient and modern.

Hints to Travellers, Scientific and General. Edited for the Council of the Royal Geographical Society, by Douglas W. Freshfield, Hon. Sec. R. G. S., and Captain W. J. L. Wharton, R. N., F. R. S., Hydrographer to the Admiralty. Sixth Edition, Revised and Enlarged.

8vo.

London, 1889.

(from the Royal Geographical Society.)

It is said in the preface that this sixth edition of the well-known "Hints" is substantially a reprint of the fifth, with such corrections and additions as time and experience have suggested. Critics more competent and more pitiless could not well be found, but the little book has no reason to fear even them. It has won and will keep its place as the necessary companion of every one who would see the world to the increase of knowledge for himself, or for others; and the reading of it is profitable even for those few persons, every day diminishing in number, who are content to do all their travelling at home.

Le Sénégal—La France dans l'Afrique Occidentale. Par le général Faidherbe, de l'Institut. Ouvrage contenant 18 gravures d'après les dessins de Riou, 3 gravures de Thiriat d'après des photographies, et 5 cartes ou plans.

8vo.

Paris, 1889.

The introduction to this monumental book closes with the words: "The state of my health would not have allowed me to finish the work which I now lay before the public but for the help given by Captains Bizard and Brosselard and, especially by Captain Ancelle; and

for this help I now offer them my sincere acknowledgments."

The book had hardly made its appearance when death put an end to the author's long and most honorable career. Senegal, says General Faidherbe, is the oldest colony of France. It is, none the less, by the common consent of all who are acquainted with its history, the creation of General Faidherbe himself, since he first of all established it upon a firm foundation and gave it space and breadth and symmetry. Made governor of the colony in 1854, he applied himself to the study of the country and the tribes, their manners and their languages, and their relations with each other and with the French. He won the native chiefs, whenever it was possible to win them, by friendly overtures; but when, as with El-hadj Omar, a conflict was found to be inevitable, the governor accepted it without hesitation and forced it to a conclusion with equal ability and vigor. He planted military posts at every commanding point from the sea-coast to the head-waters of the Senegal, and the supremacy of the French in all that territory has never since been called in question. He provided for the future extension of the French influence to the eastward by planning an expedition beyond the watershed that separates the Senegal from the Niger; and the voyage of Lieutenant Caron on this latter river as far as Timbuktu is the realization of Faidherbe's large design.

There are, says General Faidherbe, three distinct zones in the western part of North Africa, the Tell, the Sahara, and the Soudan. The Tell is the region north of the Sahara, and a true European region, for it is not

the Mediterranean but the Sahara, which divides Europe from Africa. South of the Sahara, in Senegambia, is Africa, with its two seasons; the dry season, from November to July, when the heat is almost endurable, when it never rains, and the desert wind does not blow; and the rainy season, with its excessive heat and pernicious fevers and stifling calms, broken by torrents of rain and violent storms. Here the flowers are few and scentless; there is an infinite variety of birds, with most brilliant plumage, but generally songless; there are vast rivers, abounding with the hippopotamus and the sea-cow and the crocodile, and unbroken forests that shelter the elephant and the giraffe. This is the home of the black man, who has suffered so much at the hands of others more civilized than himself; a being naturally good, with an intelligence comparable to that of many of the whites, but deficient in character, that is to say, in force of will, of forethought and of perseverance, so that he will always be at the mercy of more highly-gifted races.

There are exceptions even to this rule, and General Faidherbe quotes, from a work printed at Amsterdam in 1789, a very dramatic story of a revolt planned by five hundred captives in Western Africa. The plan was reported to the whites by a child, 12 or 13 years old, and the commander of the garrison assembled the negroes in the fort and questioned the two leaders, who confessed their design and said that they and their companions had been moved to win their freedom, not out of hatred to the whites, but because they were all ashamed of not having died with arms in their hands instead of submitting to slavery. The chiefs were put

to death, and the others were sent to the West Indies. These Senegambians are often indomitable men, and one of them at St. Louis, not many years ago, having been recaptured after frequent escapes, refused to eat or drink for ten days because his hands had been bound, and he would not lick up his food, he said, like a dog. To save his life his hands were untied when his food was brought. Stories not unlike this are told of the Minas in Brazil and the Lucumis in Cuba ; and General Faidherbe finds an explanation of the submissive temper shown by most of the negro slaves in America in the fact that the resolute and high-spirited mostly fight to the death when the slave-hunters attack the villages, and that few of them are captured.

The finest race among the blacks of Senegambia is the Wolof, which takes readily to civilization.

The right bank of the Senegal is held by the Trarzas, the Braknas, the Douaish and others, known collectively as Moors, and held in detestation for their cruelty.

The products of Senegal are cotton, indigo, rubber, palm-oil, skins, timber, cattle, rice, honey and wax, sorghum, ground-nuts, gums and coffee, which is, according to General Faidherbe, the very best in the world, and the parent of the Mocha berry.

The successive advances of the French into the interior of the country are described briefly and yet with such detail that no significant fact in the history of Senegal, since the abolition of slavery in 1848, is neglected.

General Faidherbe's conclusion is that Senegal presents an almost infinite field of activity to French commerce, which must content itself with "colonies of this type since, so far from producing the necessary emi-

grating element, we have need of a million immigrants at home."

He gives a negative answer to the question whether the French are a colonizing people. Two-thirds of the Europeans in Algeria, he says, are Spaniards and Italians; and he has no illusions with regard to Canada as a typical French colony.

His language deserves to be studied. "We were once able to colonize," he declares, "and we are so no longer, and the causes of this degeneracy are not far to seek. It is true that Canada has been peopled by a Franco-Norman race, but it has prospered and the colony availed itself of its boundless natural resources because it was violently separated from the mother-country a hundred and twenty-six years ago. Among the people of the same race as the Canadians, that is to say, among the inhabitants of the Departments of Seine-Inférieure, of Eure, of Calvados, of La Manche, and of Orne, the birth-rate is to day the lowest in all France. While it is in Canada a matter of pride to have a very numerous family, in our Norman province the birth-rate is now inferior to the rate of mortality. This is the result of selfishness or of immorality. It is probable that if Canada had remained a French colony to the present day, the influence of our manners would have made itself felt there by the constant personal intercourse, by the action of literature and art and the drama, and the Canadians would no longer be regarded as an eminently prolific race."

The maps show the Western Sudan, Saint Louis in 1854, Saint-Louis in 1885, and Dakar in 1850 and in 1888.

Russian Explorations, 1725-1743. Vitus Bering: the Discoverer of Bering Strait. By Peter Lauridsen. Revised by the Author, and Translated from the Danish by Julius E. Olson. With an Introduction to the American Edition by Frederick Schwatka.

Chicago, 1889.

Mr. Lauridsen's book is rather a defence than a biography of Bering. The Danish navigator, who is called a German in the last edition of the Encyclopædia Britannica, has not always met with justice at the hands of men. He was harshly dealt with by the Russian Senate and the Admiralty; and Captain Cook was the first to recognize his worth. Cook's judgment has been approved by many distinguished seamen of the last hundred years, but others, and foremost among them Baron Nordenskiöld, have roused Mr. Lauridsen's wrath by their treatment of Bering. The tone of controversy pervades the present book to an unpleasing degree, and the generous heat of the author, or the translator, carries him beyond bounds. Mr. W. H. Dall is one of Bering's supposed enemies, and the heading of Chapter XVII. mentions him in these words: "Dall, the American writer, reprimanded." What is the relation between the two writers that gives to Mr. Lauridsen the authority to *reprimand* Mr. Dall?

Mr. Lauridsen would have done better work if he had approached his subject in a calmer frame of mind; and there was the greater inducement to do this that Fortune has not, on the whole, been cruel to Bering. The sea and the strait that he discovered bear his name, and the glory of planning the great Northern Expedition—extravagantly called by his biographer "the greatest

geographical enterprise that the world has hitherto known"—belongs to him. These are titles to fame, if fame has any value, and the man who has won them is beyond the need of defence.

The folding maps in the volume present : Bering's Chart of his First Voyage, Berch's Chart of 1728, Müller's Map of Bering Peninsula, 1758, Kaiak Island, Spangberg's Chart of the Kuriles and North Japan, 1738-39, Bering's and Chirikof's Expeditions to America, 1741, and Fr. Lütke's Map of Bering Island, 1827.

Le Congo Français du Gabon à Brazzaville. Par Léon Guiral, ancien attaché à la Mission Scientifique de l'Ogooué et du Congo. Préface par M. J. Künckel d'Herculais. Ouvrage orné de gravures et d'une carte.

Paris, 1889.

Léon Guiral died of the African fever at the end of the year 1885.

He was twenty-seven years old and had already done good work, both as a naturalist and as an explorer, in the Congo region. The present volume is made up of his notes, published almost as he left them, and they testify to very uncommon qualities in the writer. The chapter on the Batékés, who live on the watershed between the Ogowé and the Congo, seemed to Dr. Hamy so remarkable that he asked permission to print it in the *Revue d'Ethnographie*.

Another tribe, or nation of Batékés, inhabits the two sides of Stanley Pool, known to the natives as Nkuna, but there is nothing, except the name, common to these and to the Batékés of the Ogowé.

At Stanley Pool M. Guiral was received with the

greatest cordiality as the "son of the Commandant" (de Brazza). This was on the right bank of the Pool, where there were no European establishments, and the natives had the feeling that they were neglected by the white men, of whom they knew only de Brazza and Guiral, and Stanley. M. Guiral told the chiefs that the French were coming to settle in the country. "Let them come," was the answer; "this land belongs to the Commandant. He is the only one who is on our side. Bolimuntari (Stanley) killed some of our people. If he comes here he will find the villages deserted." The Batékés on the left bank of the Pool cherished a grudge against Stanley for the severe vengeance he had taken upon them; but M. Guiral remarked that all the Batéké chiefs did not share this sentiment. This was one of the frequent indications of the European rivalries on the Congo, and their effect on the natives.

It was only a short time after his talk with the chiefs that M. Guiral met Stanley, at Ngubela, on the left bank of the Congo. There was a great crowd round the explorer's hut. Guiral entered. Stanley rose, shook hands with his visitor and gave him a seat. There were some whites and a number of native chiefs in the hut.

One of these, Ngubela, made himself at home and even pushed his stool in between Stanley and Guiral. The conversation was in French, which Stanley spoke "well enough to be understood." Two of Ngubela's children ran in and out, fanning their father from time to time with journals which had been given to them, and the chief occasionally requited this service with a mouthful of beer, contributed in an unconventional way from the draught he had just taken.

Stanley spoke of de Brazza with a good deal of bitterness, and Guiral, to avoid committing himself on a subject so delicate, feigned ignorance of the incidents mentioned. He adds: "I saw well enough that Stanley had heard of my coming, and had brought together the crowd of various tribes and the chiefs to impress me with the evidences of his power in the country."

Invited to a second interview, Guiral maintained the same reserve, though Stanley plied him with questions. They met a third time, and that evening Stanley was extremely gay, full of talk and very cordial in manner.

"Stanley's hut," says Guiral, "was like an arsenal. There was a gun under his pillow, and above his bed hung rifles, a Martini, a Snyder, and two Winchesters, besides a shot-gun.

"He is continually on his guard. He lives alone in a hut that stands by itself, and he eats alone. He keeps an impassable distance between himself and his people. He is a veritable military leader, with his lieutenants and his soldiers, and his stated hours for reports, after which he must not be disturbed except for some grave matter. He is severe, and the blacks tremble in his presence. I do not know whether he commands the attachment of those about him. I speak principally of the Europeans; but it is certain that he exercises a great influence over all the members of the expedition, from the Belgian officer to the last Kruman. All have the most absolute confidence in him."

These interviews took place in 1882, and M. Guiral gives the following picture of Stanley: "He is of middle height, narrow-shouldered, and with a rather thick neck. His almost white hair contrasts with a close-cut,

irreproachably black moustache. He has large and prominent eyes and a keen glance, which becomes fixed when he questions the person with whom he talks. At the least excitement his generally pale face flushes."

A Concise Dictionary of the Principal Roads, Chief Towns and Villages of Japan, with Populations, Post-Offices, etc.: Together with Lists of Ken, Kuni, Kōri, and Railways. Compiled from Official Documents by W. N. Whitney, M. D. Interpreter of the U. S. Legation, Tōkyō. Tōkyō, Yokohama, Shanghai, Hongkong and Singapore.

8vo.

London, 1889.

(from the Author.)

This little volume, which contains in all but 400 pages, is nothing less than an epitome of the Japanese Empire.

The preface clears up many doubtful points. Since the time of the Restoration (1868) the government has been an absolute monarchy, conducted by a Cabinet appointed by the Emperor. Certain modifications prepared the way for the new constitution, promulgated February 11th, 1889, to take effect January 1st, 1890.

The Government will then consist of the Emperor, the Cabinet and the Diet, this comprising the House of Peers and the House of Representatives. The first Session will be held in 1890.

The main divisions of the Empire are forty-six in number, *viz.*: Three imperial cities (Tōkyō, Kyōto, and Ozaka), forty-two prefectures, and one territory (Yesso and neighboring islands).

The *Ken* are prefectures, the *Kuni* provinces (no longer politically recognized), and the *Kōri* counties.

There are tables of Japanese weights, measures, and money, a sketch of the Japanese syllabary and orthography, and an appendix, containing the constitution of the Empire, the law for the organization of cities, towns and villages, and statistical information respecting territory, population, commerce, industry, justice, army and navy, religion, and other subjects.

If a constitution could decide such matters, some things in Japan would be beyond the reach of change. The Emperor, at least, possesses all reasonable security against the fate of Dom Pedro II. in the declaration made in Chapter I, Article 1: "The Empire of Japan shall be reigned over and governed by a line of Emperors unbroken for ages eternal."

The area of the Empire is 24,794.36 square *ri*, each of 5.9552 square miles. The proportion of cultivated land is, in Nippon, 59.25 per cent., in Shikoku 4.76, in Kyūshū 11.41, and in Hokkaidō 24.58 per cent.

The population numbered on the 31st Dec., 1887, 36,069,007, almost equally divided between the sexes.

There were in 1886 6,611,461 children (3,472,787 boys and 3,138,674 girls) of age to attend school. Of these, 3,063,186 (2,152,767 boys and 910,419 girls) were actually in attendance, and 3,548,275 (1,320,020 boys and 2,228,255 girls) did not attend school.

TITLES OF PAPERS IN GEOGRAPHICAL JOURNALS.

AMSTERDAM—*Kon. Nederlandisch Aardrijkskundig Genootschap, Tijdschrift.*

Places of more than 10,000 Inhabitants in the Netherlands on the 1st January, 1889, with the Absolute and the Relative Increase during the

year 1888—Communications relating to the Scientific Exploration of Flores and the Ki Islands—Some Particulars Concerning the Mongols, from Przjevalsky's Fourth Journey in Central Asia—The most Important Travels of Netherlanders in the Nineteenth Century and their Chief Geographical Works for the same Period—On the Indian Question in the United States—The Paris Geographical Congress, 1889—The West Coast of Atjeh—Engano (west of Sumatra), its History, Inhabitants and Products—A Word on the Map of Samarang—The Plans for Draining the Zuyder Zee—Voyage of the Austrian Corvette *Zrinyi* in the West Indies; with a Supplement—Amendments and Additions to the "Journeys and Explorations in North America"—Some Observations on Mammalia, made by R. Schuiling in "Wallace's Boundary Line a Continental Limit"—Development of our Acquaintance with the Pamír Region.

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Schweinfurth's Travels in Arabia Felix—Captain Kund in the Southern Kamerun—Dr. Walther's Report on the Results of a Voyage to the East Indies in the Winter of 1888–89—Dr. Philippson's Peloponnesian Journey in the Spring and Summer of 1889—Dr. Warburg's Travels in Formosa—Dr. Hettner's Fourth Report on his Travels in Peru and Bolivia.

Zeitschrift.

The Determination of Geographical Position by the

so-called Method of Statical Lines—On Projections of the Map of Africa—The First Journey of a European to Damaraland—The Wanyamwezi—Dr. Nansen's Official Report to Counsellor Gamél, in Copenhagen.

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The Congo State and the Arabs—The German Emin Pasha Expedition—The Question of Malaria from the Point of View of Tropical Hygiene—What is to Become of the Freed Slaves?—The Somali—The Situation in East Africa—Transactions of the Section for Medical Geography, Climatology and Tropical Hygiene at the Sixty-second Congress of German Scientists and Physicians—The Three-Americas Congress—The German Commercial and Plantation Society in the South Sea—A New Protectorate in East Africa—The Colonial Situation—From German Vituland.

BRUSSELS.—*Société Royale Belge de Géographie, Bulletin.*

The Topographical Evolution of a Great City—Recent Discoveries in Egypt (Jules Leclercq)—Narrative of the Attempt at Flemish Colonization in Mexico—The Samoan Islands—The Lower Congo—Tierra del Fuego and the Falkland Islands—The International Geographical Congress in Paris, 1889—An Excursion in Campine—Léopoldville—The Province of São Paulo, Brazil—The Universal Hour and the Initial Meridian.

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The Italian Protectorate in Abyssinia and at Shoa

—News of Stanley—Tekna (North-Western Sahara)—Stanley and Emin—Commercial Progress on the Congo—A New English Colony : Zambesi—The Portuguese and the English in Nyassaland—The Congo Railway—The Lower Congo—Missions on the Congo—The Conquest and the Loss of the Egyptian Soudan—Stanley and the Relief of Emin Pasha.

BUENOS AIRES.—*Instituto Geográfico Argentino, Boletín.*

The Naturalist in Brazil—Customs of the Matagayo Indians—The Chaco and its Rivers—American Linguistic Studies.

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Communications to the International Geographical Congress—The Territory of Formosa (between the Paraguay, the Pilcomayo and the Rio Bermejo)—In the Chaco—The Territory of the Chaco Austral.

EDINBURGH.—*The Scottish Geographical Magazine.*

Narrative of an Exploring Expedition to the Eastern Part of New Guinea.—The Present and Future of Queensland (Carl Lumholtz)—The Physical Conditions of Barents Sea—On the Achievements of Scotsmen during the Nineteenth Century in the Fields of Geographical Exploration and Research—The Cocos-Keeling Islands—On the Temperature of the Tidal Estuaries of the South-East of England—Report to Council on the British Association Meeting at Newcastle, 1889.

FLORENCE.—*Sezione Fiorentina della Società Africana d'Italia, Bullettino.*

The Western Somali—Opia and the Italian Protectorate on the Somali Coast—A Reconnoissance up to Asmara—Italy in Eastern Africa.

GENEVA.—*L'Afrique Explorée et Civilisée.*

General Survey of African Events—Chronicle of Slavery and Reports of the Missions—Tanganyika—Letter from the Zambesi.

GOTHA.—*Petermanns Mittheilungen.*

The Adai-Choch in the Central Caucasus—The "Rigi" in the Cascade Mountains—Ice-Caves—Kangaroo Island—The Hydrographic Characteristics of the Rudolf Lake Region—Orotava Valley in Teneriffe—The Latest Earthquake in Greece—British North Borneo—The Map of Usambara—Bokhara at the Beginning of a New Epoch—Journey in Southern Iceland—Surveys and Cartography in Netherlands-India.

LONDON.—*Royal Geographical Society, Proceedings.*

Lake Tanganyika—The Bijouga or Bissagos Islands, West Africa—The Geographical Congress in Paris—Geographical Co-ordinates in the Valley of the Upper Nile—Wind-Action in Egypt—An Expedition across Australia from South to North, between the Telegraph Line and the Queensland Boundary, in 1885–86—Explorations and Ascents in the Caucasus in 1889.

MADRID.—*Sociedad Geográfica de Madrid, Boletín.*

Roman Roads between Toledo and Mérida (by

Don Francisco Coello)—Authentic Notices of the Famous River Marañon and the Apostolic Mission of the Society of Jesus, of Quito, in the Vast Forests of that River. Written in 1738 by a Missionary of the Society, and now Published for the first time by Marcos Jiménez de la Espada — Brief list of the Maps and Plans in the Private Library of the King (Cesáreo Fernandez Duro)—Edrisi's Geography of Spain (Don Eduardo Saavedra).

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The English at Puerto Cansado (on the Atlantic Coast of the Sahara)—Spanish Missions in Africa—The Anti-Slavery Congress—New Markets for Spanish Industries—The Samoan Group—The Rif Question—The Geographical Congress in Paris—Colonization of Mindanao—The Pennsylvania State Fair in 1888.

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Peking and the Pekingese—Fernando Po, West Africa—The Sea and Shores of Azov—Notes of Travel from Shanghai to St. Petersburg—Correspondence: An Island in Lake Nyassa, From Newcastle to Yenesei, the East African Question, the Slave Trade in Central Africa.

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Ostrich Farming—Italian Travellers—Correspondence: From Rome; from Barbadoes—French Guiana and M. Coudreau's Explorations—The Panama Canal.

PARIS—*Société de Géographie, Compte Rendu.*

Remarks of the President on the Death of Gen. Faidherbe—Letter of the Lisbon Geographical Society announcing its intention to celebrate in 1897 the Fourth Centenary of Vasco da Gama's Discovery—Reception of the Remains of de Langle, the Companion of La Pérouse—Route from Russia in Europe to the Amur River—Ostrich Farming in the Sahara—Maistre's Travels in the Centre and West of Madagascar.

Bulletin.

Report on the Work of the Society and the Progress of Geographical Science in 1889 (by M. Ch. Maunoir)—The French Sudan, 1887-1888 (by Lieut.-Col. Galliéni).

La Géographie.

Norkenskiöld—Colonial Movement among the Nations—The Part of Topography in History—The Washington Congress—The Gorges of the Tarn and Montpellier-le-Vieux—The Future of Tonkin—The Italians in Ethiopia—The French Sudan—The New Hebrides—The Republic of Hayti—The New Survey of France—The Transvaal—The Brussels Conference—Portugal and the English Machinations in Africa.

RIO DE JANEIRO.—*Sociedade de Geographia de Rio de Janeiro, Revista.*

Geographical Glance at the Province of São Paulo—Explorations in Matto-Grosso—The International Congress in Paris—Immigration into Brazil—Meteorology.

ROME.—*Società Geografica Italiana, Bollettino.*

Shoa and the Neighboring Countries—Studies in Topographical and Hydraulic Geology—The Island of Nias (W. Coast of Sumatra).

VIENNA.—*Kais. Königl. Geographischen Gesellschaft Mittheilungen.*

On the Columbus Literature—The Western Portion of the Illyrian Mountain Region—The Historical Geography of the Black Sea—Hong-Kong, Canton and Macao.

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The North-Western Boundary of India—Meteorology of Brazil—A Vacation-Trip in New Zealand—Dakota—The Portuguese in East Africa—Jerusalem—The Geographical Distribution of the living Representatives of the Family *Cervus*.

WASHINGTON.—*National Geographic Magazine.*

Irrigation in California—Round About Asheville—A trip to Panamá and Darien—Across Nicaragua with Transit and Machete (R. E. Peary, Civil Engineer, U. S. N.).

WASHINGTON LETTER.

WASHINGTON, DECEMBER 10, 1889.

Commander Henry F. Picking has been designated to succeed Lieut. G. L. Dyer as Chief of the Hydrographic Office of the Bureau of Navigation. Under Lieutenant Dyer and his immediate predecessor, Commander Bartlett, the methods and results of the Hydrographic Office have been made available and practically useful to the public. In addition to the branch offices at New York, Boston, Philadelphia, Baltimore, New Orleans and San Francisco, new branches have been established at Portland, Oregon, Norfolk, Va., and Savannah, Ga. Other offices will be located as soon as the condition of appropriations will admit. During the past year sixty-six new charts have been published. The general localities covered are in Newfoundland, Nova Scotia, West Indies, Gulf of Mexico, South America, California, and islands in the Pacific and East Indies. In addition, the publication of the great circle sailing gnomonic charts of the North and South Pacific and Indian oceans completes the set of these charts for the great oceans. The charts of the North and South Pacific and Indian oceans will be found particularly useful; that of the North Pacific, for the ocean travel between the United States and the China Sea; those of the Indian and South Pacific in the New Zealand and Australian trade. All who use these charts in connection with a knowledge of the prevailing winds and currents of

the ocean gain daily advantage in the great sea-routes. There are now eight hundred different Hydrographic Office charts, and nearly thirty thousand copies were issued during the past year.

Especial attention is being given by the Office to the subject of marine meteorology. Within the last few years this science has made vast progress, and although ocean storms differ in certain marked ways from those on land, yet it is only a difference of degree. This Division under the charge of Mr. Everett Hayden is now thoroughly systematized, and it is expected that the present permanent force of marine meteorologists will be able gradually to develop Pilot Charts of all the oceans, similar to that now issued monthly for the North Atlantic. Probably no strictly nautical publication has ever had a greater success than this chart. The issue of March, 1888, and the supplements for February and August of the same year were exceptionally popular. The March chart contained diagrams and directions for the use of oil in calming heavy seas, taken from Captain Karlowa's prize essay on the subject. It was distributed amongst all classes of sea-going people, and was the means of saving many lives and much property during the very stormy months of March and April and the early part of May. The use of oil for the purpose of smoothing dangerous seas is becoming universal, but it is believed that much may still be learned as to the most suitable kind of oil and the best methods and appliances for using it for this purpose. The February supplement gave a very complete account of the remarkable cruise of the famous derelict schooner *W. L. White*, which was abandoned off the capes of the Delaware dur-

ing the March "blizzard," and crossed the Atlantic in an erratic track in ten months and ten days. She was reported forty-five times, and for six months remained off the Grand Banks, directly in the track of transatlantic steamers. The August supplement was devoted principally to the history of the raft which broke away from the steamship *Miranda* in December, 1887, and became such a great menace to navigation. It experienced a series of severe Northwest gales which broke it up and drove the scattered portions across the Gulf Stream. The drift of the logs was indicated graphically and discussed in the accompanying text. It afforded an interesting illustration of the direction and force of the prevailing winds and currents in the North Atlantic.

Lieut. J. A. Norris gives in detail in the Annual Report of the Hydrographer for 1889 an account of the expedition which left New York for Vera Cruz in November, 1888, for the telegraphic determination of longitudes in Mexico and Central America. The results of this valuable work are about ready for publication. The same party is preparing for further labor in the West Indies and on the Spanish Main. A similar expedition in 1883 determined the position of Vera Cruz in latitude and longitude; and another in 1884 fixed the position of La Libertad in Salvador.

In the preparation of the new charts for Sunda Strait, Singapore and Rhio Straits, and the passages from Java into the China Sea, the Hydrographic Office has adopted a new system for the spelling of Malay names, which it is proposed to follow in future publications relating to regions for which Malay has principally supplied the nomenclature. The new system is based

on the Dutch orthography of Malay, as found in the latest publications of the Hydrographic Office at Batavia.

The latest Batavian spelling of a Malay name is transcribed in accordance with the following rules :

oe, the vowels *oe* are changed to *u* simply ; as

Batu for Batoe, Sumur for Soemoer, etc.

y is substituted for *j* when this letter is not preceded by *d* or *t* ; as, Payung for Pajoeng, Tamuyang for Tamoejang, etc.

j is substituted for *dj* ; as, Jati for Djati, Pandjang for Pandjang, etc.

ch is substituted for *tj* ; as, Kechil, for Ketjil, Sanchang for Santjang, Chipanchur for Tjipantjur, Chilachap for Tjilatjap, etc.

i is substituted for *ie* in words ending in that syllable, the *e* being mute after *i* ; as, Mandiri for Mandirie, Kali for Kalie, Banyuwangi for Banjoewangie, etc.

In regard to merely descriptive names, as *tanjong* (cape or point), *pulo* (island), *gunong* (mountain), *gusong* (shoal), etc., the practice is in favor of translating them, except in cases where, for reasons of euphony or long usage, the Malayan appellation may be retained. Also, names which have long been written in a form that has become familiar to American eyes will not be changed, although the spelling may not be in accordance with the adopted system, as *Anjer*, *Singapore*, *Banka*, and a few others.

Older Batavian charts are not relied on for correct spelling, as they show many differences from the more recent Batavian charts.

In Malay literature there is a great diversity in the manner of spelling many words, and the pronunciation of the same name varies according to locality. The Malay alphabet consists of thirty-four letters, and the English alphabet does not therefore accurately correspond with it without additional symbols, which it is not desirable to introduce on nautical charts.

It is for these reasons impracticable to prescribe absolutely correct rules of pronunciation, and as the rules should be simple, only an approximation to the true sound is aimed at in the system here given, which, in the main, will be found to correspond with that proposed in the British Admiralty China Sea Directory, Vol. I. 1886, pages v and vi.

PRONUNCIATION OF VOWELS AND DIPHTHONGS.

- a*, as in Java, Banka.
- e*, as in Pernambuco, Mexico.
- i*, as in Chili, Mississippi.
- o*, as in Formosa, Bangkok.
- u*, as in Sumatra, Peru.
- ai*, as in Shanghai, or as I in Ireland.
- au*, as ow in Howard, or as ou in house.
- ao*, but slightly different from au, as in Macao.
- ei*, but slightly different from ai, or nearly as the ie and ye in die or dye.

PRONUNCIATION OF CONSONANTS.

- b, d, f, h, j, k, l, m, n, p, r, s, t, v, w, x* and *z*,
the same as in English.
- ch*, as in Churchill, Chichester.
- g*, is always hard, as in game.

y, as in yard, yes.

ng, as in finger, singer.

gk, as in Nang-ka (the *g* should never be dropped, as in Banka for Bangka, the syllable ending in *g* being usually the root of the compound or derivation).

kh and *gh* are oriental gutturals, as in Khan, Ghazi.

ALASKA.—There are two chapters of interest in Capt. Healy's account of the *Corwin's* cruise in the Arctic Ocean in 1884, recently printed.* (1) Descriptions of Bogoslov Island and the new volcano in Bering Sea, and (2) Narrative account of the exploration of the Kowak River.

According to Surgeon Yeman of the *Corwin's* party, the newly formed portion of Bogoslov Island lies in latitude 53°, 55', 18".5 N., and longitude 168°, 00', 21" W. It is nearly circular in shape, and distinctly volcanic in origin. Two other navigators saw this island in 1883, but the party from the *Corwin* was the first to land. It is not definitely known when the new land arose from the sea, but it was probably in the year 1882.

As seen from the deck of the *Corwin* in 1884, it had the appearance of a dull gray, irregularly shaped hill, about five hundred feet in height; from the sides and summit of which volumes of steam were rising. A closer examination of what appeared to be patches of vegetation revealed only collections of condensed sulphur. No animal life whatever was found; nor could any satisfactory examination of the fissures be made owing to steam,

*Report of the cruise of the Revenue Marine Steamer *Corwin*, in the Arctic Ocean, in the year 1884. 4to, Washington, 1889.

fumes and heat ; it being hot enough in one of the crevices through which steam was escaping to melt the solder fastenings of the thermometer, and expand the mercury sufficiently to burst the bulb. The discharge from the vents was perfectly regular, unaccompanied by much, if any, noise.

The explorations of the banks of the Kowak River are the first ever recorded. The steam-launch started from Cape Krusenstern July 8th and returned August 30th. It traversed 370 miles up river and 204 miles in exploring Lake Selawik and its region. The prime object for which the expedition was sent, viz. : the exploration for a lake which was supposed to exist at the headwaters of Kowak River, or a ready means of communication between the settlements on the Yukon River and those on the shores of the Arctic Ocean, was not accomplished ; but the narrative of Lieut. J. C. Cantwell abounds with interesting details of the examination of the topography of the surrounding country which resulted in several important changes being made in the maps of that section. Ethnological and natural history notes are treated in separate chapters.

Commander C. H. Stockton of the *Thetis* reports that during the cruise of that vessel in Bering Sea, no evidence was seen of the existence of either of the two reported islands southwestward of the Pribyloff Islands, or of a shoal indicated on the chart as doubtful in about latitude $57^{\circ} 30' N.$, Longitude $167^{\circ} 25' W.$; also that the concurrent testimony of several Revenue Marine officers and the commanding officers of the Alaska Commercial Company's steamers is against the existence of this shoal or the islands.

From the same source the following late information relating to the north coast of Alaska, from Point Barrow to Mackenzie Bay is derived. On August 8, 1889, the *Thetis* started on a cruise to the eastward of Point Barrow, which extended as far as Mackenzie Bay. In the main, the contour line of the coast as shown on Hydrographic Chart No. 912 is correct. The coast line, however, is out of latitude in various places, being generally plotted several miles too far to the northward. This is especially the case in the vicinity of Flaxman's Island and the eastern part of Lion Reef. The other more prominent outlying shoals and islands are mostly correct in latitude, but their indicated positions with respect to the main land and their general directions are in many cases erroneous. The soundings are relatively well placed as regards the coast, but the absolute positions are often wrong, as indicated on the chart. Ice is always found along and near the coast between Point Barrow and Herschel Island, the heavier ice resting either upon or in the close vicinity of Tangent Point, Cape Halket, Lion Reef, Manning Point and near Herschel Island. With westerly and northwesterly winds, the pack ice is likely to come down upon the shore at one or all of these points. A northeasterly wind in turn clears the ice off the coast and opens a lane. Vessels going to the eastward after the first week in September, or remaining to the eastward after that time, should be prepared for wintering.

Tangent Point is low and flat, with many small lagoons. It is represented by the natives as being almost entirely the delta of a river, most probably the Ik-puk-puk. The shoal off Cape Halket reported by Captain Knowles,

of the whaler *Pacific*, was not met with by the *Thetis*, but several whaling vessels this year report it at a distance of three miles N. 81° E. from what is represented as an island just inside of Cape Halket. It is stated that this island, which lies close inside and to the eastward of Cape Halket, is connected by a low sandy neck with the main land.

Pelly Mountains were not found by the *Thetis*, and certainly do not exist where placed by the charts. The concurrent testimony of the whaling masters who know the locality, and the natives who hunt in that neighborhood is strong evidence against the existence of these Mountains. In going eastward the Franklin Mountains were the first ones met. From the point of view of the *Thetis* they seemed continuous with the Romanzoff Mountains.

Several islands, one of them about three miles long, extend from Return Reef to the sand island shown off the Colville River, in Harrison Bay. These islands are not shown on the Hydrographic Office chart, and appear to have no name among the natives, and they have been designated "Thetis" islands. They number, as far as seen, four, and run in a general way parallel to the main coast line. The group of small islands extending about east and west off Yarborough Inlet are really the terminal islands at the western end of Lion Reef. Being about midway between Lion Reef proper and Return Reef, they have been designated "Midway" Islands. The westernmost of these islands is in latitude $70^{\circ} 28' N.$, longitude $147^{\circ} 53' W.$, and has been named "Cross" Island.

On Collinson Point and on Barter Island are to be found during the summer, rendezvous and encampments

of Eskimo, meeting there for the purpose of trade, similar to the same rendezvous in Kotzebue Sound. Here the eastern and western Eskimo, or more correctly the western and the middle or Mackenzie River Eskimo meet, also the Luces or Rât Indians, who come from the vicinity of the Porcupine and Rat rivers, and who have a principal rendezvous and habitation at the Rampart Station. They are generally Christians and inoffensive. There is no permanent settlement either at Collinson Point or Barter Island.

Herschel Island is about five hundred feet in height, has a rounded outline, sloping gradually from the centre on all sides, and shows an appearance of former glacial action. The vegetation is confined to grasses and small arctic flowers. On the east side of the island there is a small snug harbor, named Pauline Cove. An open bay, named Thetis Bay, on the same side of the island, was found by the *Thetis* and three steam whalers to be a fairly good anchorage with westerly and northwesterly winds. There is a rise and fall of the tide amounting to about three feet in the vicinity of Herschel Island.

The schooner *Norway*, while cruising in July, 1889, in Bering Sea, passed near to the charted position of the "supposed island" southward of the Pribyloff Islands. The weather was quite clear at times, but no island was seen. When the vessel was in Amoughta Pass, Aleutian Islands, about midway between and on a line joining the south point of the eastern extreme of Seguam Island with the north extreme of Amoughta Island, the pass between Tchegoula Island and Amoughta Island was well open, showing Tchegoula Island to be further

to the northward and westward than is indicated on the charts.

BOUNDARIES.—When the Secretary of State in March last submitted to Congress certain documents and maps relating to the undetermined boundary line between Alaska and British Columbia, being the papers and memoranda of Mr. W. H. Dall and Dr. George M. Dawson, referred to in my letter of June 15, 1889, the documents alone were printed, without the maps. The entire report, documents and maps have been recently issued.*

It will be remembered that during the sessions of the Fisheries Conference in Washington in 1887–88, it was suggested that an informal consultation between some person in this country possessing knowledge of the questions in dispute, and a Canadian similarly equipped, might tend to facilitate the discovery of a basis of agreement between the United States and Great Britain, upon which a practical boundary line might be established. Mr. Dall and Dr. Dawson were selected as principals in the consultation.

The inclosures with the Report of the Secretary of State are as follows :

1. Mr. Dall to Mr. Moore, January 3, 1888.
2. Dr. Dawson to Sir Charles Tupper, February 7, 1888.
- 2a. Same to same, February 11, 1888.
3. Mr. Dall to Mr. Bayard, February 13, 1888.
4. Same to same, December 19, 1888.
5. Memorandum on the Alaskan boundary, by William H. Dall, A. M.

* Senate Ex-Doc. No. 146, 50th Congress, 2d Sess.

6. Supplementary memorandum on the views of General Cameron as submitted in the letter of Dr. George M. Dawson to Sir Charles Tupper, by William H. Dall.
7. Convention between United States and Russia, April 5-17, 1824.
8. Anglo-Russian treaty, 1825.
9. American-Russian treaty, 1867.
10. Two tracings by the Coast Survey, showing the features of the region on the north shore of Portland Inlet, near its mouth.
11. British Admiralty Chart, No. 2,431, showing the latest British survey of Portland Inlet.
12. Chart 3 of French edition of Vancouver of 1799; covering region north of the 45th parallel of latitude.
13. Chart 7 of same, covering territory between parallels 54° and 57° north latitude.
14. Official Canadian map of British Columbia, 1884.
15. Dawson's Canadian map, 1887.
16. Dawson's Canadian map, 1887, showing conventional lines proposed by Canada.
17. Canadian map, January 23, 1888.

Advices to the latter part of August have been received from the Coast Survey party sent out at the instance of the Secretary of State to make a preliminary survey of the frontier line between the 141st meridian of west longitude at or near where it crosses the Yukon River. The points of destination had not been reached. Captain McGrath writes under date of August 19th that he was then two hundred miles beyond that point on the Yukon, which is half way between St. Michael's

and where he expected to go. The river much resembled the Mississippi. Indian settlements were numerous, the mountains magnificent, and the forests luxuriant. The ground was frozen hard anywhere below ten inches, but in spite of this the weather was so warm that every man was going around in his shirt sleeves.

The parties separated at Fort Yukon on the 2d of July. Turner and his party went up the Porcupine in a steamer—the first one ever seen on that river. Fort Yukon is but a name. There is not a stick of one of its houses left. The English used to think it belonged to them, but a survey showed that it was twenty-five miles within our territory, and as there was no business to warrant occupation, the houses of the Hudson Bay Company were allowed to go to ruin.

Under date of August 21st Captain McGrath writes that he was four or five miles outside of the United States line, and did not expect to get any more letters out this year nor in the spring.

Henry L. Whiting, of the Coast Survey, has made a report as referee on the disputed boundary line between Maryland and Hog Island. The report awards the disputed territory to the State of Maryland. After reviewing the original charter which adopted the high-water mark as the boundary line and the award of the arbitrators in 1877 which changed the line to low-water mark, Mr. Whiting concludes as follows: "I am prepared to say, on the part of the Coast and Geodetic Survey, that, according to the text of the award of the arbitrators of 1877, as descriptive of the boundary line between Maryland and Virginia, no mathematical or physical construction can be put upon the meaning of said descrip-

tion which will locate and define this cognate boundary line and low-water mark in any other place or make it conform to any other course of the river than that which they have ascertained and determined to be the low-water mark on the south shore (right bank) of the Potomac River, as marked and shaded in red upon the coast chart No. 33 of the United States Coast Survey, which is filed as part of the said award and explanatory thereof. This clearly illustrates the intended location of the boundary line and conforms to the terms and meaning of the award."

Information has been received from the joint boundary commission of New York and New Jersey, that it is proposed to erect at once a permanent monument at the turning point in the boundary line between New York and New Jersey in Raritan Bay. The monument will be situated 1 5-8 miles S. $64^{\circ} 21'$ E. from Great Beds light-house, and will be marked "State Boundary Line, New York and New Jersey." It will consist of an iron beacon surmounted by a ball and spindle, painted white, the whole structure being thirty-seven feet above mean low water, and having a circumference of ripraps, the diameter of which will be 100 feet. Position: Latitude, $40^{\circ} 28' 35''$ N.; longitude, $74^{\circ} 13' 32''$ W.

IRRIGATION.—The Director of the United States Geological Survey has notified the Secretary of the Interior of the selection of the following sites for reservoir purposes, situate in the several States and Territories designated, all of which selections have been approved by the Department:

Clear Lake, Lake County, California, together with

all lands situate within two statute miles of the borders of said lake at high water. Letter dated June 7, 1889.

Independence Lake, Nevada County, California, together with the lands bordering thereon. Letter dated August 5, 1889.

Donner Lake, Nevada County, California, together with the lands adjacent thereto. Letter dated August 5, 1889.

Webber Lake, Sierra County, California, together with the lands bordering thereon. Letter dated August 5, 1889.

Twin Lakes, Lake County, Colorado, together with all lands situate within two statute miles of the borders of said lakes at high water. These lakes are in close proximity to each other. Letter dated July 8, 1889.

Sampitch River, San Pete County, Utah, the lands included in said proposed site being situate in sections 16, 21, 28, 32 and 33, township 18 south, range 2 east. Letter dated July 18, 1889.

Sevier River, Millard County, Utah, the lands therein being situate in sections 2, 3, 10, 11, 14 and 15, township 17 south, range 7 west, Salt Lake meridian. Letter dated July 26, 1889.

Bear Lake, Utah, together with all lands adjacent thereto and within two statute miles of the borders of said lake at high water. Letter dated July 19, 1889.

Bear Lake, Bear Lake County, Idaho, together with all lands situate within two statute miles of the borders of said lake at high water. Letter dated July 19, 1889.

Montana.—Sections 21 and 22 township 9 north range 2 east; section 12 township 9 north, range 2 west; sections 7 and 8, township 9 north, range 3 west; sections

18 and 19 township 18 north, range 6 west; sections 13 and 24, township 18 north, range 7 west; sections 5 and 8, township 22 north, range 4 east; and of township 22 north, range 3 east; all of township 26 north, range 7 west; and section 17, township 25 north, range 6 west. Letter dated July 19, 1889. These lands are located in Meagher, Jefferson, Lewis and Clarke and Choteau counties.

Rio Grande River, above the site of El Paso, N. Mex., as an international dam and reservoir: and public lands on the right bank of the Rio Grande River, between the Mexican boundary line and a point 20 miles above that boundary line and extending 4 miles west of said right bank. Said lands are situate in townships 26, 27 and 28 south, range 2 east, and townships 26 to 29, inclusive, south, range 3 east, Las Cruces district. Letters dated July 13 and 30, 1889.

CONGRESS OF AMERICAN NATIONS.—The discussions of the congress of American nations promise to extend well into the summer of the year 1890. Since the 18th of November time has been chiefly occupied with adjournments and the consideration of rules, which also provide for the appointment of the following committees:

An executive committee of five members, to receive and record nominations of Vice-Presidents from the several delegations to designate the officer who shall preside in the absence of the President; to superintend the publication of the protocols and reports of the proceedings, and to provide generally for the conduct of business;

A committee on customs union, composed of five

members, to consider and report a basis for an American Customs Union, and the advisability of a division of the subject into sections, according to the geographical situation of the countries represented in the conference and the similarity of interests involved ;

Three committees of five members each to consider and report upon the best means of extending and improving the facilities for transportation and postal and telegraphic communication between the several countries represented that border on the Atlantic Ocean, the Pacific Ocean, and the Gulf of Mexico and the Caribbean Sea, respectively ;

A committee of five members to consider and report on the subject of railway communication between the several countries represented ;

A committee on Customs Regulations, composed of five members, to consider and report upon the best method of improving and simplifying customs regulations in the several ports of the countries represented ;

A.—Formalities to be observed in the importation and exportation of merchandise ;

B.—Classification, examination and valuation of merchandise ;

C.—Methods of imposing and collecting fines and penalties for the violation of the customs and harbor regulations ;

A committee of five to consider and report upon the best method of securing uniformity of lighthouse, pilot, and other harbor dues ;

A committee of three to consider and report upon the adoption of a uniform system of weights and measures ;

A committee of seven to consider and report upon the best method of establishing and maintaining sanitary regulations in commerce between the several countries represented ;

A committee of three to report upon the best method of protecting patents, publications, trade marks and right in commerce between the countries represented ;

A committee on extradition, composed of three members, to consider and report upon the establishment of a general convention between the countries represented ;

A committee on monetary convention, consisting of seven members, to report the basis of a monetary convention between the countries represented in the conference ;

A committee on banking, to consist of five members, to report a method of improving and extending the banking facilities and credit system between the countries represented ;

A committee on international law, to consist of five members, to report uniform rules of private international law affecting civil and commercial matters and the legalization of documents ;

A committee on general welfare, to consist of seven members, to report some plan of arbitration for the settlement of disagreements that may hereafter arise between the several nations represented in the conference, and to receive, consider and report upon any other topics that may be proposed other than those included in the invitation from the Government of the United States.

ARCHÆOLOGY.—The recent discovery of archæological remains by Mr. W. H. Holmes, of the U. S. Ethnolog-

ical Bureau, in the vicinity of Rock Creek, a tributary of the Potomac near Washington, is regarded as of high importance. Within a mile of the city limits a quarry workshop of early stone workers has been unearthed, and can be seen to-day almost exactly as it was left by the ancient workmen. The first discovery of these remains appears to have been made in 1887 by an assistant of Mr. Holmes, who was sketching in the vicinity, and who by chance found an implement in the gravel at his feet. He subsequently came upon a number of heaps of refuse in a ravine. In September, 1889, Mr. Holmes obtained the consent of the owner of the property to work upon the premises. After a careful survey he excavated a trench which cut a section directly across the line followed by the ancient workmen. He found a little below the surface a belt of worked material fifty feet wide and on an average about six feet deep, containing upwards of three thousand specimens. It is probable that the entire site contains over a million finished, unfinished and broken implements. Out of fourteen hundred that have been carefully examined there were only twelve that approached anything like perfection. The conclusion is that the perfect specimens were carried to the villages of the workmen to be completed at leisure. No remnants or traces of tools were found.

An examination of the quarry workshop made it apparent that the period of occupation was very long, but Mr. Holmes thinks there is no geological evidence to carry the history of man in this place back beyond the age of the American Indian.

TIERRA DEL FUEGO.—Capt. St. Clair, of the British steamer *Champion*, reports recent information (March,

1889) bearing on the condition and inhabitants of the eastern coast of Tierra del Fuego. Between San Sebastian and Good Success bays natives were seen at most parts of the coast. Some Europeans engaged in gold mining were seen at Nombre Head, about ten miles northward of San Sebastian Bay, where there were several buildings and a flag-staff flying the Argentine flag. Also, near Cape Medio, some Europeans were found searching for gold. At Good Success Bay an Argentine government settlement was found. At Sloggett Bay a gold mining company is established. The coast is visited every three months by an Argentine government vessel.

LA PALLICE.—The artificial port of La Pallice, destined to be one of the great ports of France, and begun by the Government some eight or nine years ago, is rapidly approaching completion. The necessity for this work arose from the impossibility of maintaining in a satisfactory condition the harbors of Bordeaux and La Rochelle. The former is obstructed by a bar which re-accumulates almost as fast as it is dredged away, making it dangerous for large vessels, even at high tide, to attempt an entrance. The latter is quite filled up with sand, and the commerce of the place is now confined to coastwise trade in small steamers and schooners.

La Pallice, before this work was begun, was partly in farms and partly in barren sea-coast. It lies on the west coast of France, about four miles west of La Rochelle, and a railroad has been surveyed to connect it with the latter place. The Compagnie Générale Transatlantique is under a contract with the French Government to establish a regular line of steamers to America as soon as the port shall be open.

There are an outer port, inner basin, locks and dry docks. All the excavations were literally hewn out of rock. The masonry is for the most part composed of stones found on the spot, but the walls are faced with granite. About a mile from the entrance are two light-houses, located respectively on the islands Oléron and Ré. The entrance to the outer harbor is to be marked by light-houses, one on either side. This outer harbor has an area of about thirty-five acres with a depth of water varying from thirty-one to thirty-seven feet at high tide, to sixteen to twenty-three feet at low tide. In the inner basin a uniform depth of from twenty-eight to thirty-four feet of water will be maintained. The land surrounding this basin is reserved for wharves, warehouses, tramways, railroads, and all facilities for handling, moving and storing merchandise. Somewhat over \$4,000,000 have already been expended on these works by the French Government. This amount, which it is understood includes also the acquisition of land, seems like a very moderate expenditure, but when the cost of labor, (58 cents a day) which of itself constituted the larger part of the outlay is taken into account, it will be readily seen that equal results in the United States would have involved at least twice the amount.

CADIZ.—The Department of State is advised that an English company is seeking a franchise to build and operate at Cadiz at fixed tariffs a system of deep-water docks of sufficient capacity to accommodate one hundred large ocean steamers. The proposed tariff reduces the present cost of unloading ships 50 per cent. The parties interested are the Spanish Transatlantic Steamship Company, the Andalusia Railroad Company and

the English Dock Company. The railroad company proposes to run trains from Cadiz to London in fifty-two hours, and the steamship company to send a vessel a week to South America and New York. All cargoes for the interior will be discharged at Cadiz and forwarded by rail; and all goods for export, as well as transatlantic passengers will be taken on there. At present, all large vessels discharge to small boats in the bay, and the mails for America, as well as much of the export business of Spain are taken on at Lisbon.

CAPRERA.—In the month of May, 1889, a new submarine telegraph cable was established between Talamone, west coast of Italy and Caprera Island, north coast of Sardinia.

MOSSAMEDES.—Information has been received that, owing to a late convention between Portugal and Germany, the coast line of Mossamedes, south of the Cunene River, has been handed over to the Germans. A cable having been laid between the Cape of Good Hope and Mossamedes, and continued from Mossamedes to St. Paul de Loanda, the telegraphic circuit of Africa is now complete, and communication with the Cape via the west coast may be more expeditious than by the old route via the Red Sea and Zanzibar. A new line of Portuguese steamers to go as far as the Cape and Delagoa Bay was to start in July. From Mossamedes the steamers are to go to Lisbon in eighteen days. It is proposed to start a railway line to go about two hundred miles into the interior.

The climate of this district, situated on the west coast of Africa, between $13^{\circ} 50'$ and $17^{\circ} 25'$ south latitude, is described as excellent, and on the high plains

behind the Schella Mountains as suitable for Europeans. Fever is uncommon, and contagious diseases only appear when imported in vessels, and rarely take the form of an epidemic. The death rate is very low.

ST. HELENA.—Continued decline from its former prosperity is noted in regard to the historic island of St. Helena. The primary cause is the diversion of traffic by the way of the Suez Canal, although other causes, such as the decrease of the whaling industry and different methods of provisioning ships for long voyages, the reduction of the garrison and consequent diminished disbursements for maintenance by the British Government, have had marked effect. It is reported that many merchants have emigrated for the want of business, and that there is not much occupation left for the few who remain. Nevertheless the native population increases, and there is a large surplus of labor on the island. Within a short time the English steamers have offered passage to Cape Town at half rates to encourage emigration.

KOREA.—The following information relating to Ping Yang inlet and Taton Bay, west coast of Korea, is derived from a report by Ensign F. M. Bostwick of the U. S. S. *Palos*: The village at the head of the bight, between Corries Point and Rocky Point, is known as Chang Ihen. The head of Ping Yang inlet receives the waters of two rivers: the Wucl-tang from the southeastward, and the Tatung (incorrectly Ping Yang on H. O. Chart 224) from the northward. The Tatung is much the larger of the two rivers. The town at the mouth of the Tatung is Chel-To. Referring to British Admiralty Chart No. 1258, Tatong River should be

Taton Bay. No river is there. The head of the bay is at the point marked Haiju (Hae-Chow-Poo).

HYDROGRAPHIC NOTES.—Captain John Van Helms of the steamship *Newbern* reports as follows in regard to San Luis Gonzales Bay and Ometepes Bay, East coast of Lower California :

Willard's Point, the northern headland of San Luis Gonzales bay, is about eight miles N. 69° W. from Point Final. From Willard's Point the bay (Willard's Bay) runs in a north westerly direction five miles, and is then separated from a lagoon by a narrow strip of sand. The lagoon is shallow, and abounds in turtle, fish and game. The bay is apparently free from hidden dangers, and affords shelter in all weather and from all winds. There is a depth of from five to ten fathoms of water, and even near the mouth of the lagoon there is said to be five fathoms within a quarter mile from the shore. A poor quality of water was found near the shore of the northern part of the bay. The rise and fall of the tide in Willard's Bay is said to be fourteen feet. Willard's Point is about two hundred and fifty feet high, and on its extremity there is a solitary tree. The river indicated on the chart as emptying into the southwestern part of San Luis Gonzales Bay, was found to be a dry *barranca*.

Ometepes Bay (named by an exploring party on the steamer *Ometepes*), situated about twenty miles southward of Robinson's Landing, Colorado River, in latitude $32^{\circ} 30'$ N, longitude $114^{\circ} 52'$ W., has an entrance three hundred feet wide and a quarter of a mile in length, with a depth of three fathoms of water at half tide. The bay, circular in form, is about three miles wide, and

free from hidden dangers. It is land-locked, and has five fathoms of water. The rise of tide is said to be twenty-five feet. The bay abounds in turtle, fish and game.

Important changes developed by the re-survey in Nantucket Sound, have been indicated upon the charts of the locality issued by the Coast Survey Office since October 31, 1889.

The re-survey of Cape Charles Shoals in 1888, by Lieut. M. L. Wood, U. S. A., assistant in the Coast Survey, has developed a complete change in the shoals off Cape Charles, at the entrance of Chesapeake Bay, and has located a new channel, called the "Northwest channel," across these shoals. This channel has a least depth of twenty-three feet at mean low water. The new hydrography will be shown upon new editions of Coast Survey charts which will be ready about November 15th.

A recent examination of the St. John's River entrance, Florida, by Capt. W. M. Black, U. S. A., Corps of Engineers, has shown marked changes, due to the extension of the north jetty and the work of harbor improvements by the United States Engineers. These changes have been indicated upon the charts issued by the Coast Survey Office since October 25th.

Lieut. T. D. Bolles of the U. S. S. *Monongahela* reports that September 14, 1889, his vessel passed within about four miles of the chartered position of Corinthian Shoal or reef (South Pacific Ocean), indicated in about latitude $8^{\circ} 55' S.$; and longitude $170^{\circ} 15' W.$ The day was bright and clear, with sufficient sea to have caused a break on the surf, but no indications of a shoal were observed.

H.

